May 14, 1965.

Mr. Chester Whitlock,
Royal McBee Corporation,
2401 East Sunshine,
Springfield, Mo. 65804

Dear Mr. Whitlock:

I am enclosing an article we ran across in one of our periodicals which we thought might be of some interest to you since you do use some cyanides in your operation.

Very truly yours,

H. Werbitzky, Jr., P.E.,
Engineer II.

HMW:ns

Enclosure

cc-File

ROSECON INC. **UN2-5088**

. . . CONCRETE PIPE
PRECAST MANHOLES . . .

DIVISION STREET AT
THE FRISCO YARDS
SPRINGFIELD, MISSOURI

TRUMAN WALDRUP
Sales Manager *314 - ED 5-5096*

BILLY J. WATKINS
TU 1-0911 Plant Manager

Phenol residue (Paint) Mat. —
every 3 Months
~~Metal~~ HW03 Stripper —
Cyanate + Cyanide Crystals — Small Amt.
Zn + Mg dust — 2 to 4 Drum every 3 Mos.
Phosphoric Acid Stripper —

Supra designation

May 18, 1962.

Royal McBee Corporation,
2401 East Sunshine,
Springfield, Missouri.

Attention - Mr. Jack Connelly

Dear Mr. Connelly:

Yesterday our Southwest Sewage Treatment Works received a terrific slug of chromium waste. It was of the hexivalent type, one that is extremely toxic.

We believe we are processing it to the extent that little damage is being done to the receiving stream (Wilson Creek) but we will not know for several days what upset has been caused to the plant digestion facilities - an extremely noxious odor nuisance may result.

We want to assure you that the City is ready, willing and anxious to cooperate with you in disposing of your wastes, even toxic ones, which by law are prohibited from being placed in the sewers.

Will you let us know any time you're having waste problems? Maybe we can help.

Sincerely,

V. W. Whitfield,
Acting Sanitary Engineer.

VWW:ns

P.S. Please don't think that by receiving this letter your organization is being accused. The letter is going to everyone that we know or believe does chrome plating or uses chromium in their processing.

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Paul Bailey DATE June 23, 1961.

DEPARTMENT Public Works

Royal-McBee is evaporating some zinc cyanide and sometime next week they will be ready to haul it to the poison pit.

Please check personnaly the poison pit to be sure it is ready to be used with no serious cave-ins, etc. If poison pit is OK, when Royal-McBee calls, go to their plant and go with their people who will dump this to the pit at the Northwest Plant. Be certain that the material is properly dumped and the lid replaced securely. I will probably not be here when the call comes.

Holler for help if the poison pit needs working on.

ADM:ns

SIGNED

A. D. Mayfield, Sanitary Engineer.

December 1, 1960 45.2

David J. Lee
Director
Bureau of Sanitary Engineering
Florida State Board of Health
Jacksonville 1, Florida

Re: Indus. W.
Electro-Plating Gen.
/67

Dear Mr. Lee:

We have received a copy of your letter dated November 18 to Mr. Albert W. Happy, Jr., of the Missouri Division of Health, and a copy of Mr. Happy's letter dated November 22 to you concerning the pre-treatment facilities at the Royal McBee Corporation plant in Springfield, Missouri.

In a case where the industry is discharging their wastes to a municipal sewer system, we hold the municipality responsible for treating the waste in a satisfactory manner so as to prevent pollution in the receiving stream. All of our dealings in this regard are with the city.

By a copy of this letter along with a copy of your letter to Mr. Happy, we are requesting that Mr. Allen Mayfield, City Sanitary Engineer, Springfield, reply to the questions which you raised in your letter of November 18.

Very truly yours,

Edward Lightfoot, P.E.
Chief of Design and Construction
Water Pollution Board

EL:nhs

cc: Mr. Allen Mayfield
City Sanitary Engineer

Florida State Board of Health

WILSON T. SOWDER, M.D., M.P.H., STATE HEALTH OFFICER

JACKSONVILLE 1

TELEPHONE
ELgin 4-0161

POST OFFICE
BOX 210

BUREAU OF SANITARY ENGINEERING
DAVID B. LEE, M.S. IN ENG.
DIRECTOR

DIVISION OF WASTE WATER
RALPH H. BAKER, JR., M.S.S.E.
DIRECTOR

November 18, 1960

IN REPLY PLEASE REFER TO

Indus. W. Gen.
Electro-Plating /67

Mr. Albert W. Happy, Jr., Director
Section of Environmental Health Services
Division of Health
State Office Building
Jefferson City, Missouri

Dear Mr. Hoppy:

We have been approached by the representatives of the George L. Nankervis Company, Detroit, Michigan, regarding a "package" waste treatment facility for the treatment of chrome and cyanide waste. This is a continuous flow process with the use of a "solu-bridge" automatic rinse tank controller for the control of the waste concentration to the treatment facility.

We understand that your agency has accepted an installation of this type at the Royal McBee Company plant in Springfield, Missouri. We would like to know what conditions you have placed upon this installation and what data and/or comments you have regarding its operation. By copy of this letter we are requesting similar comments from the Royal McBee Company officials.

Thanking you for your early assistance in this matter, we are

Sincerely yours,

David B. Lee
Director

MLW:dcg
cc: Royal McBee Company
Springfield, Missouri

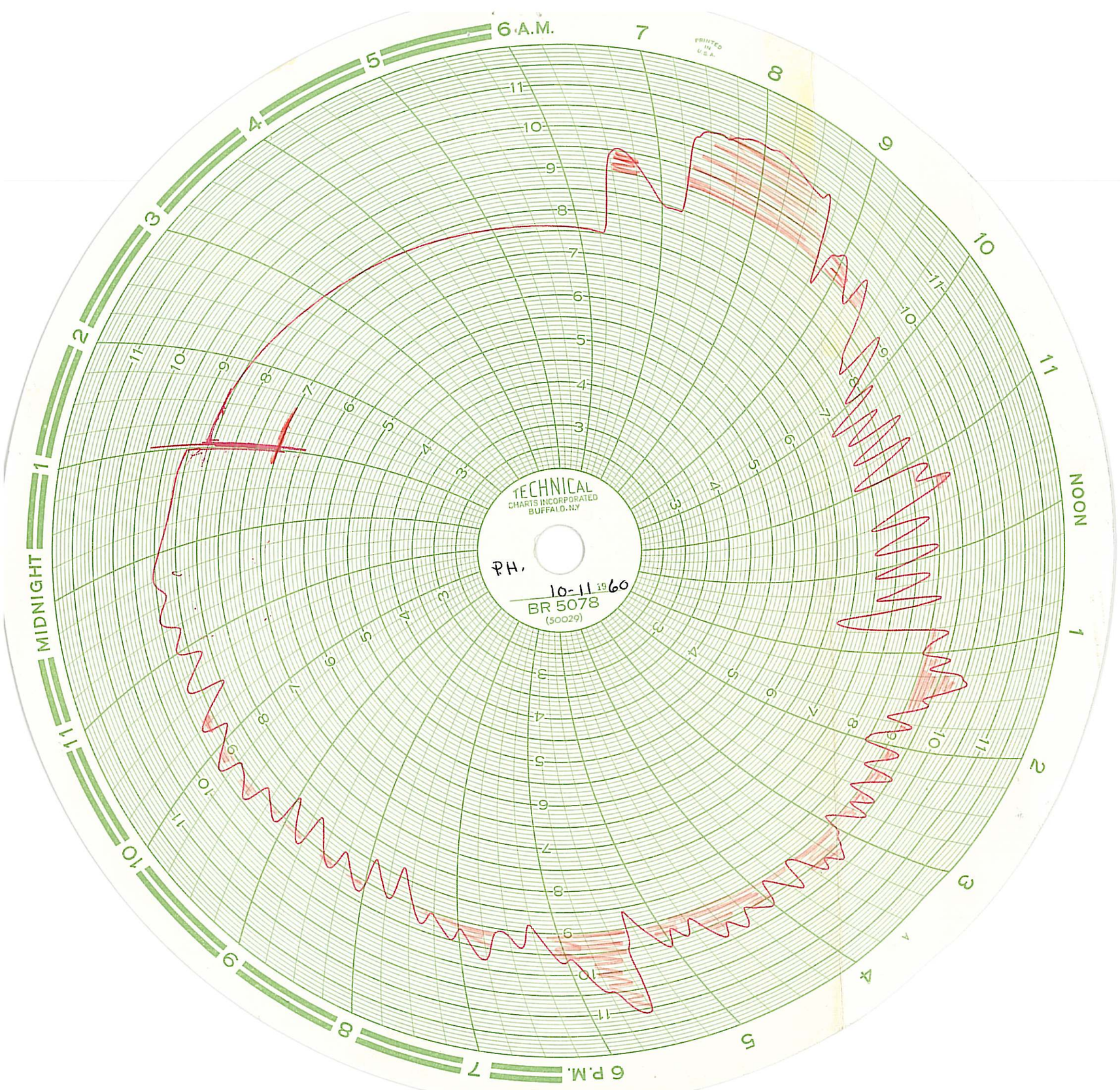
ROYAL McBEE

PH CHARTS

FROM MR C. WHITLOCK

OCT 14, 1960

Dan'l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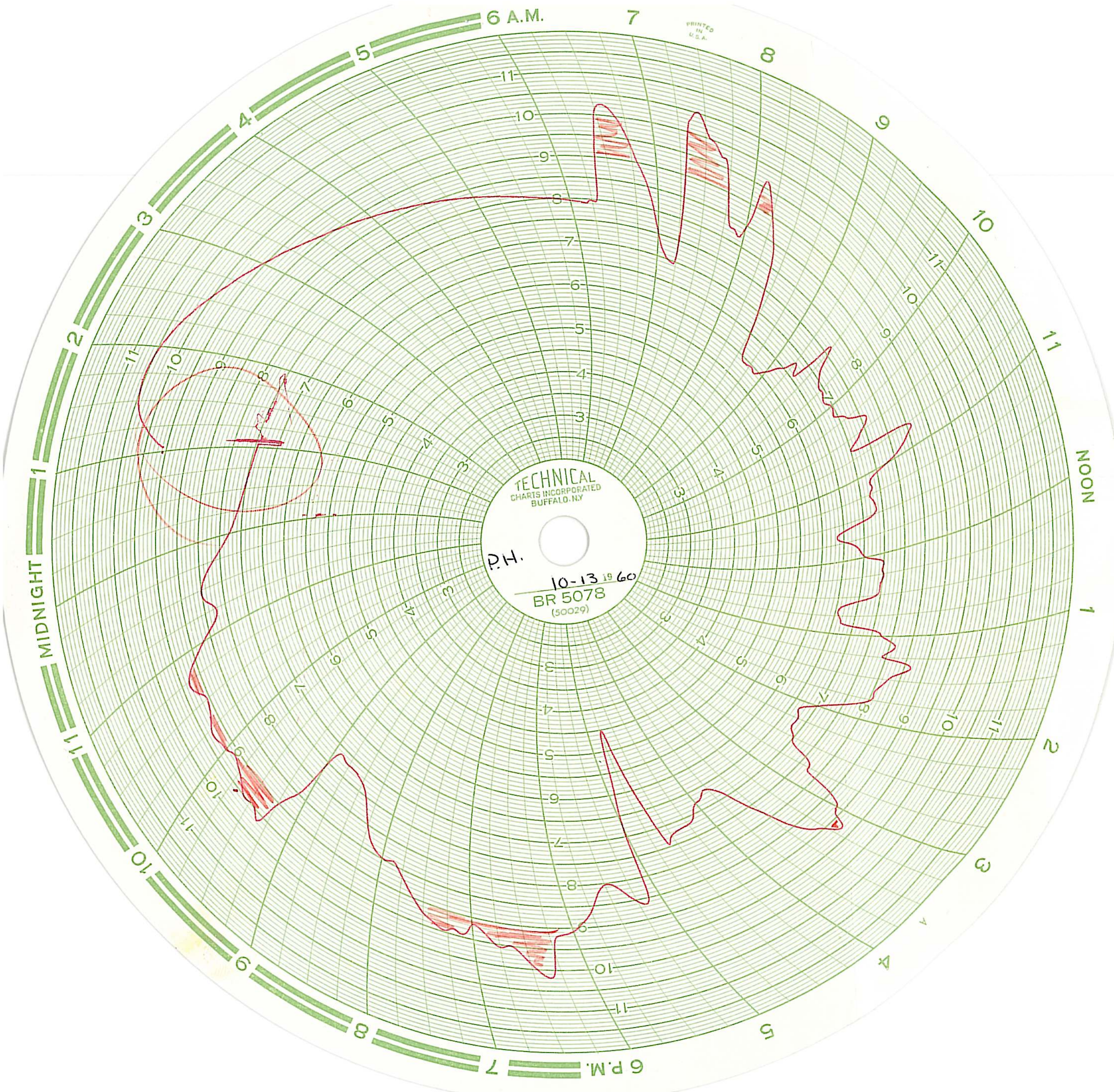
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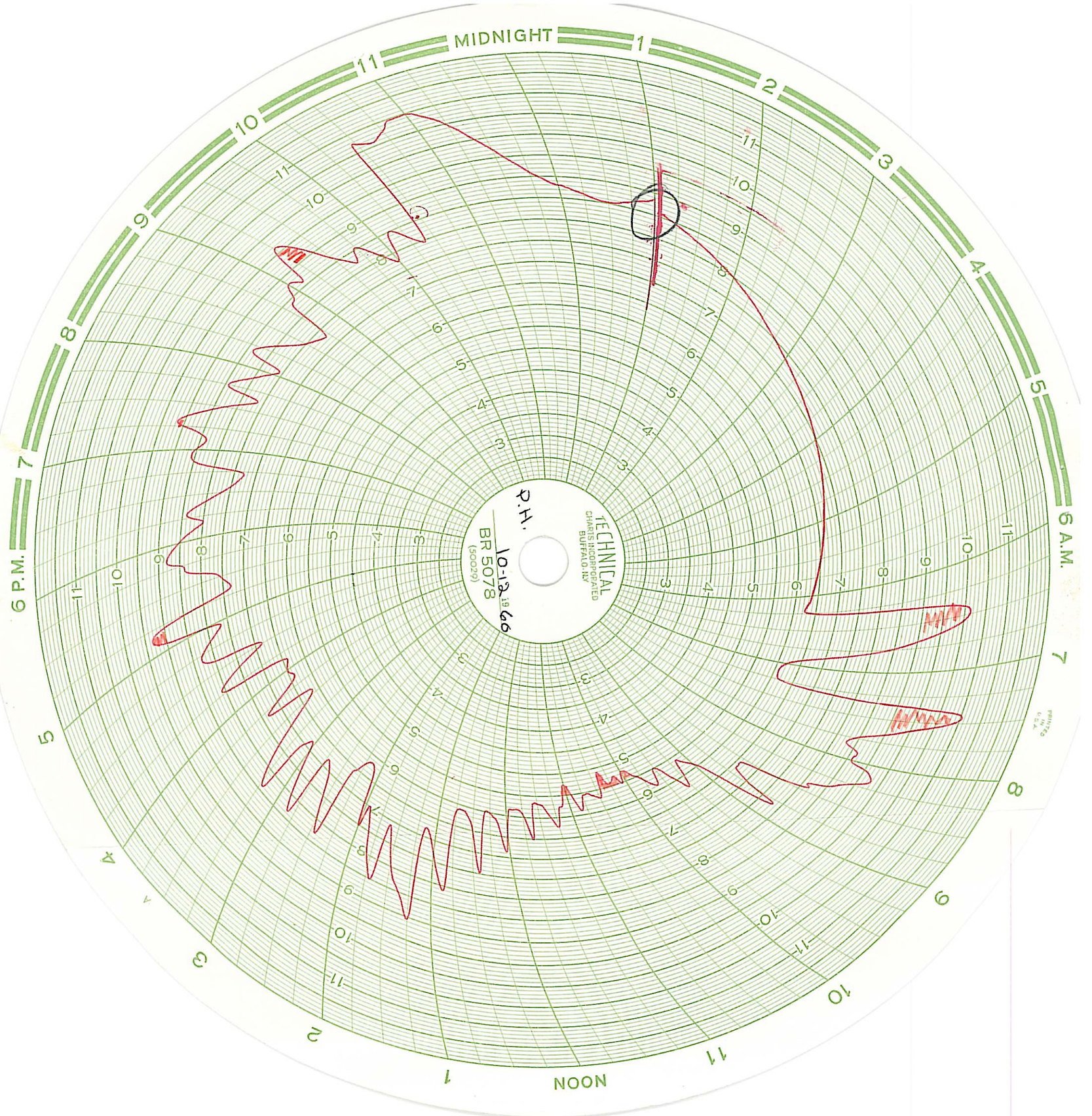
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CHARTS INCORPORATED
BUFFALO, N.Y.
BR 5078
(5002)
10-12-1966

ROYAL MCBEE WASTE AUGUST 23, 1960

6 BARRELS OF PLATING WASTE AND PHENOLIC PAINT STRIPPER WERE DUMPED IN A PIT AT THE NORTH WEST LANDFILL.
THE BARRELS WERE ALSO PUT INTO THE PIT.

THE PIT WAS CLOSED AND MARKED WITH A SIGN.

KARL DAUBEL

Zinc	30 ppm.
Sum of all heavy metals (excluding alkaline earth metals, iron and manganese).	144 ppm

If the finishing departments work more than one eight hour shift per twenty-four hours or the volume of waste from these departments exceeds 120,000 gallons per twenty-four hours, the maximum concentrations will have to be reduced.

For protection of men working in manholes and the sewage plant, a maximum concentration of 10 parts per million of cyanide at any time is required for wastes discharged into the Royal McBee sewer.

ROYAL McBEE WASTE TREATMENT
AUGUST 2, 1960 KARL DAUBEL

THE CHROMATER AND CYANIZER TREATMENT MACHINE WERE NOT WORKING. A BAD VALVE IN THE PUMP PIT IS CAUSING A SITUATION SUCH THAT THE PH SYSTEM IS NOT WORKING ACCORDING TO DESIGN. THEREFORE THE ONLY TREATMENT IS OCCURING IN THE NEW MIXING TANK JUST INSTALLED.

ROYAL MCBEE

STORM WATER DRAINAGE REPORT

AUGUST 2, 1960 KARL DAUBEL

THE ONLY INLETS IN THE BUILDING ARE IN THE PLASTIC MOLDING ROOM, HARDENING AREA, AND INSIDE LOADING DOCK.

THE PLASTIC MOLDING AREA RECIEVES WATER FROM THE MOLDING MACHINES.

THE HARDENING AREA IS DRY EXCEPT FOR THE COOLING WATER FROM ONE TREATMENT MACHINE AND COOLING WATER FROM A SOLDERING PROCESS USING A SLIGHTLY ACID FLUX (HCL).

IN THE DOCK AREA THERE IS NO SIGNS OF ANY SPILLAGE.

OTHER INSIDE CONNECTIONS ARE THE ROOF DRAINS + VENTS.

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

a29m
Indust. Wastes

ATTENTION OF Karl Daubel DATE July 25, 1960.

DEPARTMENT Public Works

This morning Bill Hedges of the Public Works Department reported to me that over the weekend there was an extremely heavy flow of milk and kerosene that showed up at the Southwest Disposal Plant.

He is concerned about the findings on your swabs. If there is a show on your swabs of the above mentioned, I would suggest that you make every effort to run this down. Also, would discuss this further with Mr. Mayfield and Mr. Hedges.

Wayne L. Hudgens

WLH:ns

SIGNED

ROYAL McBEE JUNE 1960

DAUBEL + CAIN

SODIUM CYANIDE 12-16 OZ/GAL
CAUSTIC SODA 12 OZ/GAL
ZINC CYANIDE VERY LITTLE
NICKLE SULPHATE
NICKLE CHLORIDE
BORIC ACID
CHROMIC ACID 25-30# /WK MOST OF IT GOES ON THE WORK
HCL
H_2SO_4
HNO_3
ACETIC ACID
ALKALINE CLEANERS (CAUSTIC SODA) 6OZ/GAL
SILVER FLUX (HCL)

CYANIDE NEUTRALIZER - SODIUM HYPOCHLORITE
CHROMATE NEUTRALIZER - H_2SO_4, SODIUM BISULPHATE, SODIUM HYDROXIDE

BEFORE THE WASTE NEUTRALIZATION TANK IS DRAINED THE P.H. IS CHECKED WITH P.H. PAPER.

THE TRICLOROETHYLENE DEGREASER IS REDISTILLED TO BE USED AGAIN

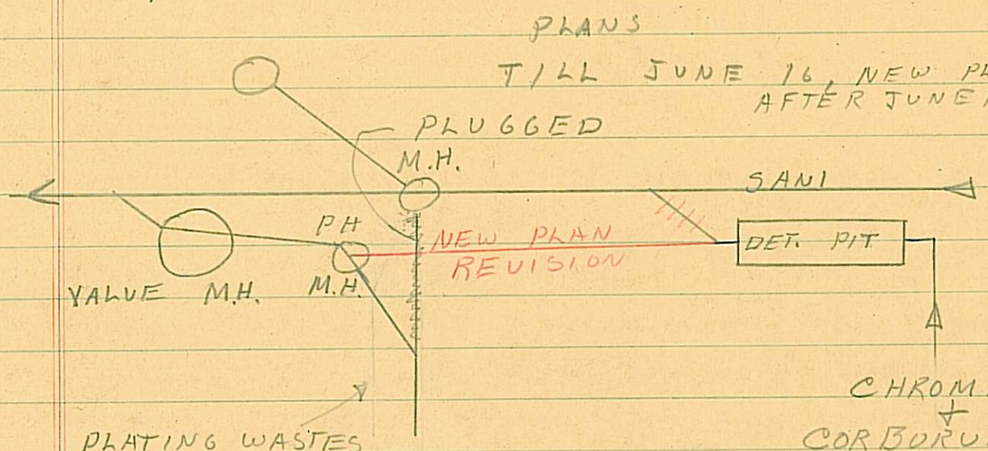
THE "AJA LIF" WASHING MACHINES ARE NEUTRALIZED & DUMPED EVERY FRIDAY.
95 GALLONS What is the material in an aja liff?

Early Letters from Royal-McBee stated that Zinc plating was their largest operation. In what form is plating Zinc? How about Cadmium and copper? Paint strippers? Soluble cutting oils, heating Treating chemicals + cyanides

METALLIC

Demulsified

ROYAL McBEE



THE CHROMATER AND CYANIZER BOTH OVER FLOW WITHOUT TREATMENT AT TIMES. TWICE WHILE I WAS THERE.
I saw overflow

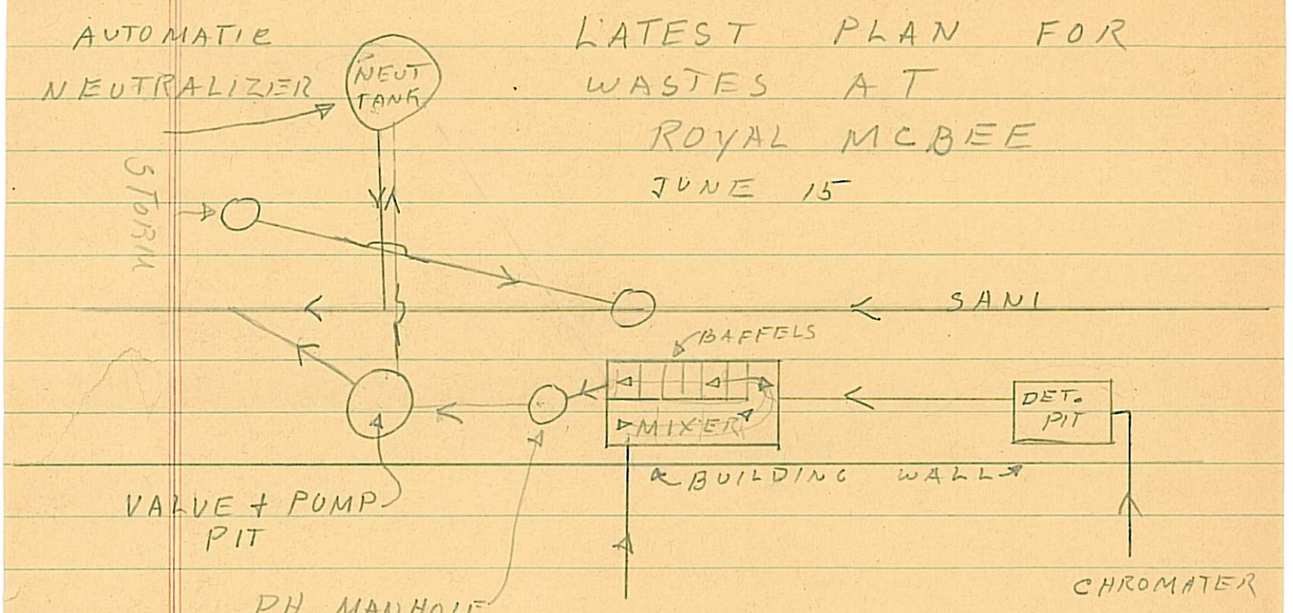
NO COPPER PLATING AT THE PRESENT MAY BE LATER. DO HAVE ONE TANK

WASTE LUBRICANTS ARE PUT IN A STORAGE TANK UNTIL DISPOSED OF. + How?

PAINT STRIPPERS 600 GALLONS EACH
510 HL PH 8.5-9.5
670 STRIPPER PH 8.5-9.5
THEY HAVE STORED THE WASTE IN BARRELS OUTSIDE AND ARE WORKING ON A DISPOSAL SYSTEM. A EVAPORATIVE POOL. AND HAVE THE REMAINDER REMOVED BY CITY TO LAND FILL

LATEST PLAN FOR WASTES AT ROYAL McBEE

JUNE 15



PERSONS CONTACTED

MR.	CONNLEY	
MR.	DORMAN NASH	
MR.	CHARLES HAND	CHEMIST
MR.	ROGER QUIMBY	SECTION FOREMAN
MR.	SMITH	ELECTRICAL CHIEF
MR.	WHITLOCK	

WASTES HAVE BEEN DUMPED WITHOUT P.H. TREATMENT. THIS HAS BEEN GOING ON FOR MORE THAN A WEEK JUNE 12-19

HC HARDENING 120

Neutral Salts.

OAKITE 20 9, Nialift

" 39 9,

" 120 9,

" 198 9,

QUAKER 156 9,

QUASOL 95 9,

PAINT STRIPPING

510 HL

This compound is alkaline, very mild

PAINT STRIPPING

670 STRIPPER

This material is an alkaline salts material.

WYAN DOTTE PRE-FLOS

Iron, phosphoric acid.

WYAN DOTTE # 397

Sodium Hydroxide, Sodium Orthosilicate, Sodium Tetraborate.

KIWK FLUX 490

This material is on acid side

Royal- McBee Sewer Use

June 16, 1960
Crew: Ricketts
Rowe
Aleshire
Broockmann

Dyed from Royal to S.W. Plant.
The dye was started in M.H.# 8
of the swab check holes.

Dyed 1:45 P.M.
Plant 6:10 P.M.
Time 4 hrs 25 min

Maximum concentrations of toxic materials have been worked up on the bases: 1. Not more than 200 cubic feet per minute of wastes from the finishing departments during a working day of eight hours.

2. The finishing departments wastes will be about one third of the total volume of sewage discharged from the plant during the eight hours.

To avoid slugs of concentrated heavy metals, the following are the maximum concentrations at any time which can be discharged into the Royal McBee sewer from the collection, retention, and pretreatment system for the finishing departments:

Material	As discharged to Sewer
Chromium only:	
Hexavalent chromium	10 ppm
Total chromium	30 ppm
Nickel only	100 ppm
Nickel and chromium combined	100 ppm including not more than 10 ppm of hexavalent chromium
Copper	10 ppm
Cadmium	18 ppm

PRELIMINARY ANALYSIS

of

INDUSTRIAL WASTE DISPOSAL

ROYAL McBEE TYPEWRITER PLANT

Average flow in 1958-1959 to old sewage treatment plant - 8,000,000 gals.

8,000,000 gal. x 8.33 lbs/gal = 66,640,000 lbs. of sewage per day

1 part per million is equivalent to 1 pound per million pounds

Therefore 66.64 lbs. of material reaching sewage plant per day would be equivalent to 1 part per million if received in proportion to sewage flows.

There are other plating plants in Springfield. Therefore Royal McBee can only be allowed a proportion of the permissible quantities of cyanide and heavy metals reaching the sewage plant.

Toxic Material	Total Pounds per Twenty-four Hours	Pounds from Royal McBee
Cyanide	67	60
Chromium only hexavalent	67	60
Total Cr	330	300
Nickel only	330	300
Combined weight of chromium and Nickel	550 including not more than 67 lbs. of hexavalent chromium	500 including not more than 60 lbs. of hexavalent chromium
Copper *	67	60
Cadmium *	198	180
Zinc only	330	300
Sum of all heavy metals (Excluding alkaline earth metals but including iron and manganese)	1980	1800

900 if also exclude iron & manganese

*Not listed or found on plans

Preliminary Analysis
Industrial Waste Disposal
Royal McBee Typewriter Plant
August 12, 1953

A large part of the Royal McBee wastes will reach the old plant at the end of the daytime flow from the rest of the city. A two to one dilution of Royal McBee sewage is probable at the sewage plant and a three to one dilution at the Royal McBee plant.

To avoid slugs of concentrated heavy metals it appears that concentration limits of materials discharged to the plant sewer will have to be set as follows:

	As Discharged to Sewer	# discharged per day (1,000,000# of finishing waste)	PPM at sewage plant
Chromium only:			
Hexavalent chromium	~~20~~ 10 ppm	10	0.6
Total chromium	~~100~~ 30 ppm	30	1.8
Nickel only	100 ppm	100	6.0
Nickel and chromium combined	~~100~~ 100 ppm including not more than ~~20~~ 10 ppm of hexavalent chromium	100 10	6.0 0.6
Copper	~~25~~ 10 ppm	10	0.67
Cadmium	~~60~~ 18 ppm	18	1.1
Zinc	~~200~~ 30 ppm	30	1.8
Sum of all heavy metals (excluding alkaline earth metals, iron and manganese)	144 ppm	144	9.0

For protection of men working in manholes and the sewage plant, a maximum concentration of 10 ppm of cyanide at any time for wastes discharged into Royal McBee sewer is proposed. — 10#/day 0.6

pH limits 5.0 to 9.0 are proposed.

In order to meet these limits and to make provisions for expansion of metal finishing operations it is therefore recommended that:

a. Drains be changed to separate metal finishing wastes from other wastes and sewage.

b. Separate drains be provided for weak solutions and for solution dumping.

c. Further separation be provided into acid-chromium wastes and alkaline-cyanide wastes.

d. Suitable tanks be provided to permit mixing, analysing and controlling discharge to the sanitary sewer. Drains from metal finishing operations should discharge only into these tanks. 148 6

If flow is at the rate of 6 MGD
this is 4,166? gal/min,
If Royal is discharging 33 with min finishing waste,
this is 248 gal/min or ~~5~~ 5.9% of the flow at the sewage plant.
Effect minimum

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Mr. A. D. Mayfield DATE July 28, 1959.

DEPARTMENT Public Works

adm.

I understand that Royal-McBee will have 500 employees in their building on Monday, August 3rd. Presume this will entail considerable more sewage pumping than we are doing now.

VWW:ns

cc-Bill Foster

SIGNED V. W. Wagner

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF W. E. Hedges DATE January 14, 1958

DEPARTMENT Public Works

The proposed extension of Line G to the edge of the Royal-McBee property will be useful only if the plant is actually built. It is therefore recommended that no commitments be made other than the engineering necessary to develop the plans until Royal-McBee has signed an actual contract for construction of the plant.

If this procedure or any other reason threatens delay in date of sewer service to Royal-McBee, said service can be expedited by shifting construction to the upper end of the line making emergency connections at the intersection of Line G and the existing 15" Phelps Grove Line at the corner of Delaware and Bennett. This same emergency procedure could be adopted if the pressure for improving Bennett at an early date becomes irresistable.

However, I am unable to make any suggestions concerning the terrific problems of accommodating surface drainage along Bennett from Glenstone east to the railroad tracks, nor the financing of road improvements.

ADM/mo

SIGNED

A. D. Mayfield, Sanitary Engineer

PRELIMINARY ANALYSIS

of

INDUSTRIAL WASTE DISPOSAL

Royal McBee Typewriter Plant

Aug 12, 1958

Avg. flow in '58-59 to old sewage treatment plant 8,000,000 gals.

8,000,000 gal X 8.33 lbs/gal = 66,640,000 lbs of sewage/day

@ 1 part per million = 1 pound per million pounds

Therefore 66.64 lbs of material reaching sewage plant per day would be equivalent to 1 part per million if veried in proportion to sewage flows.

There are other plating plants in Springfield. Therefore Royal McBee can only be allowed a proportion of the permissible quantities of cyanide and heavy metals reaching the sewage plant.

Toxic Material	Total pounds per twenty four hours.	Pounds from Royal McBee
Cyanide	67	60
Chromium only		
Hexavalent	67	60
total Cr	330	300
Nickel only	330	300
Combined weight of chromium and nickel	550 including not more than 67 lbs of hexavalent Chromium	500 including than 60 lbs. of chromium.

Copper *	67	60
Cadmium *	198	180
~~Because the cost of the~~		
Zinc only	330	300
Sum of all heavy metals (Excluding alkaline earth metals but including iron and manganese.)	1980	1800

66
30
1980

* Not listed or found on plans.

a large part of
~~Most~~ of the Royal McBee wastes will reach the old plant at the end of the ~~daily peak~~ daytime flow from the rest of the city. A two to one dilution at the sewage plant and a three to one dilution at the Royal McBee plant is probable.

To avoid slugs of concentrated heavy metals it appears that concentration limits of materials discharged to the plant sewer will have to be set as follows:

	as discharged to sewer
chromium only:	
Hexavalent chromium	20 ppm
Total chromium	100 ppm
nickel only	100 ppm
nickel and chromium combined	1.66 ppm including not more than 20 ppm of hexavalent chromium
copper	20 ppm
cadmium	60 ppm
Zinc	100 ppm

3/10

8 ppm

X/1 = 20 ppm

5/6

For protection of men working in manholes and the sewage plant, a maximum concentration of 10 ppm of cyanide (for wastes discharged into Royal Melbee sewer) at any time is proposed.

pH limits 5.0 to 9.0 are proposed.

Recommendations for collection and treatment:

March 14, 1968

Mr. Ray [illegible]y
Personnel Supervisor
Royal Typewriter Company, Inc.
2401 East Sunshine
Springfield, Missouri

Dear Mr. Silvey:

In regard to our meeting two weeks ago concerning liquid wastes from your plant that have been disposed of at our Sanitary Landfill, we would like to submit the following:

As stated to you, we have met with officials of the Missouri Division of Health, Missouri Water Pollution Board and City-County Health Department to discuss this matter and I will discuss each of these different wastes separately from the information that was submitted to us by your people.

1. Cyanide Waste - It was felt by all concerned that this is the most hazardous both from a current and future standpoint in that if this waste is discharged into a pit that self-destruction would never occur and that at some future time any use of the land in these areas would be impossible. It was felt, and emphatically stated, by the State Health Department that these wastes should be completely destroyed prior to any type of disposal.

2. Waste Cutting Oils and Trichloroethylene - It would be satisfactory to dump this material right into the active landfill operation.

3. Aluminum and Zinc Dust - This can also be dumped into the landfill. However, material should be dumped and spread from the container.

4. Waste Nitric, Phosphoric and Sulfuric Acids - It is felt that this can be satisfactorily handled in reasonable quantities each time by neutralization with limestone in a separate pit at the landfill site.

Therefore, it appears that the only material which the State Agencies definitely stated could not be discharged at the landfill was the cyanide wastes. Also, they would like to be informed by us as to what method you would select in disposing of this.

If you would like to discuss this further, please feel free to contact us.

Yours truly,

V. W. Whitfield, P.E., Director
of Public Works and City Engineer

PTH:cc

cc: George Bauer

Kayal File

March 7, 1968

Mr. Glen A. Harwell, Engineer
District Public Health
State Division of H
Springfield, Misso

Dear Sir:

As you possibly know, recently there was a fatality at the landfill we believe due to the mixture of waste cyanide solutions and acid.

We have been advised that the acceptance of these cyanide solutions is highly hazardous.

Since the landfill operates under the jurisdiction of the Division of Health Department, we would appreciate your decision as to whether or not we should accept such wastes.

Since one contributing firm is now burdened with about 25 drums of these wastes, we would appreciate an early decision.

Very truly yours,

V. W. Whitfield, P.E.
Director of Public Works
& City Engineer

VW/ec

Royal F.C.

INDUSTRIAL WASTES SYMPOSIUM
Friday, September 28, 1951

MORNING SESSION

Albert H. Halff, Sanitary Engineer, Dallas, Texas, Presiding

"TREATMENT OF CYANIDE AND CHROMIUM WASTES"

By

N. S. Chamberlin, Chemist
Technical Service Division
Wallace & Tiernan Company, Inc.
Newark, N. J.

H. B. Snyder, Jr., Manager
Sewage & Industrial Waste Sales
Wallace & Tiernan Company, Inc.
Newark, N. J.

The chemical treatments described in this paper, for the elimination of toxic cyanides and toxic hexavalent chromium in industrial wastes, represent an outstanding case of chemical dissimilarity. Cyanides are eliminated by oxidation and conversely hexavalent chromium by reduction. Such chemical treatments are not compatible simultaneously and together. Cyanide wastes and chromium wastes must be treated separately.

Oxidation of Cyanide Wastes

Cyanides are destroyed in wastes by oxidation with a basis oxidizing agent, chlorine, and alkali or a hypochlorite (an alkaline chlorine solution) at a pH of not less than 8.5. This oxidation process, now the most widely used in the treatment of cyanide wastes, is generally referred to as the "alkaline chlorination" process. The cyanides are destroyed with chlorine to either the less toxic cyanates or completely to the non-toxic nitrogen gas and carbon dioxide which latter unites with the alkali to form bicarbonates.

The reactions showing the oxidation of cyanides with chlorine, Cl_2, are given in Table I. Those involved in the destruction of cyanides to cyanates are two, "1.a.", and "1.b." The first, "1.a.", is a reaction in which the chlorine reacts instantaneously with the cyanide at any pH to form a volatile, noxious, irritating gas known as cyanogen chloride, CNCl. The second, "1.b.", is a reaction in which the cyanogen chloride at pH of 8.5 or above, as noted by the minimum sodium hydroxide, NaOH, requirement, is completely converted within 10 to 15 minutes to the much less toxic, non-volatile and relatively stable sodium cyanate, NaCNO.

The destruction of cyanides to cyanates (see composite reaction 1.) theoretically requires 2.73 parts or pounds of chlorine for each part or pound of cyanide as CN. Actually, due to the usual presence of other oxidizable material, the

chlorine requirement may be 1% to 25% higher. Theoretically, 1.125 parts or pounds of sodium hydroxide are also required along with each part or pound of chlorine applied. Actually, most cyanide wastes are sufficiently alkaline as to require only 60-90% of this amount of caustic.

The reactions showing the oxidation of cyanates with chlorine, Cl_2, are also given in this table. Those involved in the destruction of cyanates to nitrogen gas and carbon dioxide (present as bicarbonates) are two, "2.a." and "2.b.". The first, "2.a.", is a reaction in which cyanates are slowly decomposed to ammonium carbonate, $(NH_4)_2CO_3$, and sodium carbonate, Na_2CO_3, in the presence of chlorine. In this reaction chlorine does not take part chemically, but does aid in completing the reaction within 1 to 1.5 hours. The second, "2.b.", is a reaction in which the ammonium carbonate at pH of 8.5 to 9.0, as noted by the minimum sodium hydroxide, NaOH, requirement, is rapidly oxidized by the chlorine to nitrogen gas and the carbonates are converted to bicarbonates as the other main constituent. As part of this reaction, but not shown, small amounts of inert nitrous oxide, N_2O, and volatile nitrogen trichloride, NCl_3, are also formed.

The destruction of cyanates to nitrogen and bicarbonate (see composite reaction 2.) theoretically requires 4.09 parts of chlorine for each part of cyanate in terms of cyanide, as CN. Actually, due to the presence of other oxidizable matter and the formation of nitrous oxide and nitrogen trichloride, the chlorine requirements are somewhat higher. Theoretically, 1.125 parts of sodium hydroxide are also required along with each part of chlorine applied.

The overall reaction (see composite reaction 3.) involved in the destruction of cyanides to nitrogen and carbon dioxide (as sodium bicarbonate) shows that the alkaline chlorination process theoretically requires 6.82 parts of chlorine per part of cyanide. In actual operation of this process the chlorine requirements are somewhat higher by a few per cent and the caustic requirements somewhat lower.

The alkaline chlorination process can be accomplished with the following chlorine compounds: chlorine gas with caustic, chlorine water with caustic, or hypochlorite. The same amount of available chlorine is required regardless of the choice of chlorine compound. This is to be noted from the group of reactions shown in Table II, in which one active chlorine, as Cl_2, one active hypochlorous acid, HOCl, with its inactive hydrochloric acid, HCl, (made from one chlorine, as Cl_2, and water, H_2O, in a chlorinator) or one active sodium hypochlorite, NaOCl, with its inactive sodium chloride, NaCl (made from one Cl_2, water and two sodium hydroxides) react with one or the same amount of sodium cyanide to form idential amounts of sodium cyanate and sodium chloride. Likewise, similar amounts of the three chlorine oxidizing agents react with the same amount of sodium cyanide to form identical amounts of nitrogen, sodium bicarbonate and sodium chloride.

The reason similar amounts of the three chlorine compounds are required is that the available chlorine in one chlorine, as Cl_2, is equivalent or idential to that in one hypochlorous acid, HOCl, and each are equivalent or identical to that in one sodium hypochlorite, NaOCl. One should not be fooled by the fact

that one Cl2 contains 2Cl, whereas HOCl and NaOCl contain only one chlorine, Cl. The "Cl" in the compounds is no criterion of the comparative activity or availability of the chlorine. The chemical reason that one Cl_2, one HOCl and one NaOCl contain the same amount of available chlorine is that HOCl and NaOCl each contains a hypochlorite, OCl radical, which in available chlorine is equivalent to Cl_2.

That the hypochlorite or OCl fraction of HOCl and NaOCl have the same oxidising capacity as chlorine, Cl_2, is proven by the fact that each will liberate the same or identical amounts of an analagous compound, free iodine, I_2, from an acid iodide solution as follows:

$$Cl_2 + 2NaI \xrightarrow{\text{acid}} I_2 + 2NaCl$$

$$HOCl + 2NaI \xrightarrow{\text{acid}} I_2 + NaCl + NaOH$$

$$NaOCl + 2NaI + H_2O \xrightarrow{\text{acid}} I_2 + NaCl + 2NaOH$$

As mentioned previously and as shown in the group of reactions (Table II) with the three chlorine compounds, an alkali, such as sodium hydroxide, is required with either the use of chlorine as a gas or hypochlorous acid as chlorine water while none is required with sodium hypochlorite. One should not be fooled by this fact. In the manufacture of sodium hypochlorite the acid chlorine or hypochlorous acid and inert hydrochloric acid are neutralized with caustic as shown in the reactions and, in addition, the solution must contain some excess caustic.

It is to be realized that being a manufactured product, one purchasing chlorine and caustic in this form pays more for the chlorine and caustic than when each is purchased separately. Sodium hypochlorite normally is too expensive to be used for the oxidation of cyanides when required in large amounts. This means that sodium hypochlorite is too expensive to use for such treatment if more than a few pounds of cyanides are being destroyed per day.

Furthermore, when sodium hypochlorite with its excess caustic is used to destroy the cyanides in a cyanide-bearing waste that normally has a pH of 11.0 - 12.5, and therefore already contains excess caustic, the resulting treated effluent will not have a lesser pH or a lesser caustic content. Most regulatory bodies frown on the discharge of waste, treated or untreated, having a pH greater than 10 or containing caustic alkalinity.

Furthermore, when chlorine with caustic or chlorine water with caustic are used to destroy the cyanides in cyanide-bearing wastes, the pH of the treated waste can be controlled economically between 8.5 and 9.0, a pH range where caustic alkalinity is nil and one which is satisfactory to the regulatory bodies. The saving in alkali, a usage less than the 1.125 parts of sodium hydroxide per part of chlorine quoted above, results from utilizing part of the initial alkali contained in the cyanide waste.

The alkaline chlorination process for the oxidation of cyanides with chlorine gas and caustic or chlorine water and caustic is accomplished in a "flow-thru" type chlorination plant or "batch" type chlorination plant. The "flow-thru"

type of plant is normally used for the oxidation of cyanides and cyanates to nitrogen and carbon dioxide (as bicarbonates).The recirculated "flo-thru" type of plant can be used for complete oxidation of cyanides in those instances where the total waste flow to be treated is too great to hold in separate tanks for treatment. Such waste flows are also generally low in their cyanide concentration.

The physical aspects of chlorinating cyanade wastes in such treatment plants are outlined in Table III. How to consolidate wastes for chlorination is sometimes a problem. Economy in the use of chemicals and simplicity of control of chemicals applied dictate that fluctuations in cyanide concentration and volume be evened out. This is particularly a problem when the waste does not come from continuous plating operations.

The proper chlorine retention period is automatically taken care of in "batch" chlorination, but in "flo-thru" chlorination the time, as noted, is dependent upon the extent of the oxidation of the cyanide, usually 10-15 minutes, since cyanides are normally oxidized only to cyanates. This minimum retention time is overruled to a two hour retention period when metallic hydroxides, oxides or carbonates must be precipitated and removed. Last, and certainly not least, the plant must be so designed and so constructed as to eliminate any odor of cyanogen chloride and nitrogen trichloride about the plant. Through proper adherence to design any evidence of odor can be satisfactorily eliminated.

Diagrams 1 and 2 for the "flow-thru" chlorination plants, for the oxidation of cyanide to cyanate, Diagram 3 for a recirculating "flow-thru" plant for the oxidation of cyanide to cyanate or completely to nitrogen and carbon dioxide (as bicarbonates) and also applicable for the oxidation of cyanide to cyanate at a first rinse tank, and Diagram 4 for the "batch" chlorination plant for the complete oxidation of cyanide and cyanate are shown by the typical layouts.

In these Diagrams all of the physical aspects of chlorination of cyanide wastes have been adhered to in respect to consolidation of the waste, in evening out fluctuations in cyanide concentration and fluctuations in waste flow. As noted in Diagram 1 and 2, the size of the settling tank is dependent upon the presence or absence of metals. In the layout of the plants, the rule to apply chlorine or chlorine water in a closed system has been strictly adhered to except in one instance, and that not recommended except where unavoidable, as shown by the dotted lines in Diagram 1. In every other instance the chlorine is applied to the waste containing the required amount of caustic at the chlorinator injector or the chlorine as hypochlorite formed at the injector is applied to the waste at the suction of a recirculating pump. In each of these instances chlorination is always at not less than the required pH and always in a closed system and thus fulfills the conditions for eliminating odors about the plant.

Since chlorine and caustic are applied separately, the pH can be controlled automatically by controlling the caustic feed. Such automatic control, not shown in the Diagrams, is optional in any treatment plant, be it a "flow-thru" chlorination plant or a "batch" chlorination plant. Such control insures that a sufficient and economical amount of caustic is being applied at all times.

Since the method of treatment described above for the treatment of cyanide is

one of oxidation, it suggests oxidation-reduction potentials. Chlorination can be controlled automatically through potential control and is optional in any treatment plant, be it a "flow-thru" chlorination plant or a "batch" chlorination plant. Such control insures that a sufficient and economical amount of chlorine is being applied at all times in the case of a flow-thru" chlorination plant and stops chlorination when the treatment is completed in a "batch" chlorination plant.

TABLE I

REACTIONS SHOWING OXIDATION OF CYANIDES WITH CHLORINE

Destruction of Cyanides to Cyanates

1.a. $2Cl_2 + 2NaCN \longrightarrow 2CNCl + 2NaCl$

1.b. $2CNCl + 4NaOH \longrightarrow 2NaCNO + 2NaCl + 2H_2O$

1. $2Cl_2 + 4NaOH + 2NaCN \longrightarrow 2NaCNO + 4NaCl + 2H_2O$

	CHLORINE	SODIUM HYDROXIDE	SODIUM CYANIDE	SODIUM CYANATE	SODIUM CHLORIDE	WATER
PARTS	2.73	3.07	1 (As CN)			
	1	1.125				

Destruction of Cyanates to Carbon Dioxide (as Bicarbonates) and Nitrogen

2.a. $3Cl_2 + 4H_2O + 2NaCNO \longrightarrow 3Cl_2 + (NH_4)_2CO_3 + Na_2CO_3$

2.b. $3Cl_2 + 6NaOH + (NH_4)_2CO_3 + Na_2CO_3 \longrightarrow 2NaHCO_3 + N_2 + 6NaCl + 6H_2O$

2. $3Cl_2 + 6NaOH + 2NaCNO \longrightarrow 2NaHCO_3 + N_2 + 6NaCl + 2H_2O$

	CHLORINE	SODIUM HYDROXIDE	SODIUM CYANATE	SODIUM BICARBONATE	NITROGEN	SODIUM CHLORIDE	WATER
PARTS	4.09	4.62	1 (As CN)				
	1	1.125					

Destruction of Cyanides to Carbon Dioxide (as Bicarbonates) and Nitrogen

3. $5Cl_2 + 10NaOH + 2NaCN \longrightarrow 2NaHCO_3 + N_2 + 10NaCl + 4H_2O$

	CHLORINE	SODIUM HYDROXIDE	SODIUM CYANIDE	SODIUM BICARBONATE	NITROGEN	SODIUM CHLORIDE	WATER
PARTS	6.82	7.69	1 (As CN)				
	1	1.125					

TABLE II

REACTION OF CYANIDES WITH VARIOUS CHLORINE COMPOUNDS

A. FOR DESTRUCTION OF CYANIDES TO CYANATES:

SOURCE OF CHLORINE COMPOUND	CHLORINE COMPOUND WITH CAUSTIC	SODIUM CYANIDE	SODIUM CYANATE	SODIUM CHLORIDE	WATER
1. Chlorine Gas: Cl_2	$Cl_2 + 2NaOH +$	$NaCN \longrightarrow$	$NaCNO +$	$2NaCl +$	H_2O
2. Chlorine Water: $Cl_2 + H_2O \rightleftharpoons HOCl + HCl$	$HOCl + HCl + 2NaOH +$	$NaCN \longrightarrow$	$NaCNO +$	$2NaCl +$	$2H_2O$
3. Sodium Hypochlorite: $Cl_2 + H_2O \rightleftharpoons HOCl + HCl$; $HOCl + HCl + 2NaOH \rightarrow NaOCl + NaCl + 2H_2O$	$NaOCl + NaCl +$	$NaCN \longrightarrow$	$NaCNO +$	$2NaCl$	

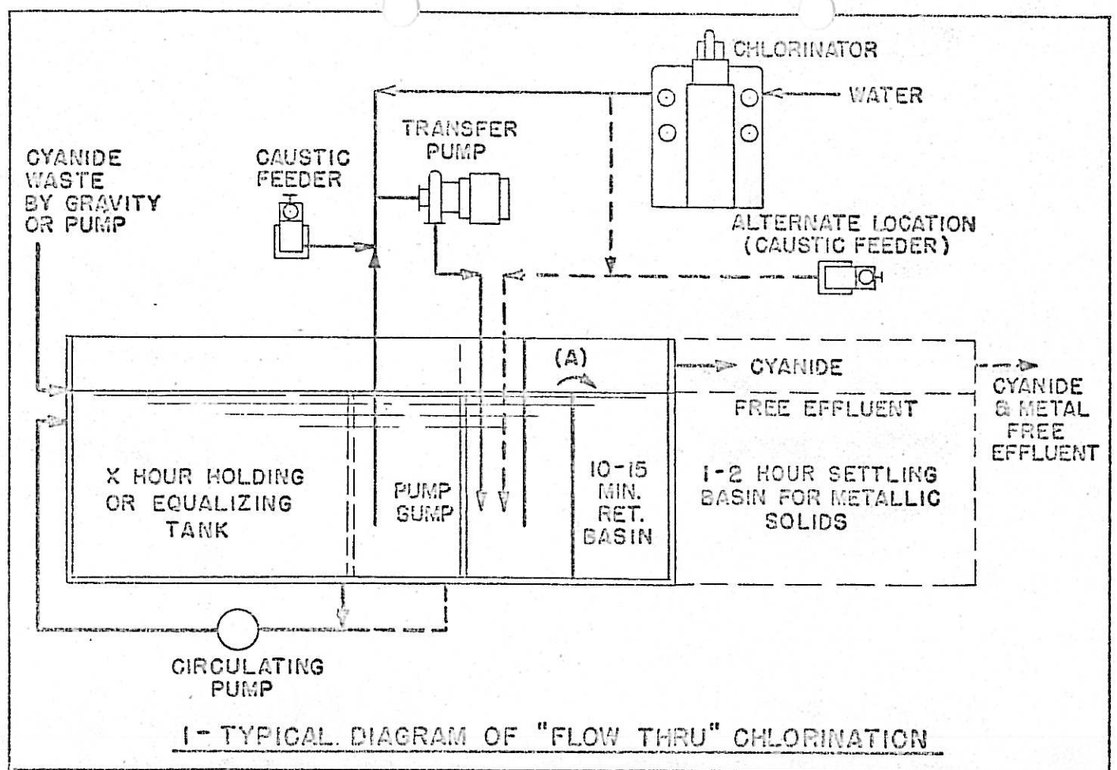
B. FOR DESTRUCTION OF CYANIDES TO CARBON DIOXIDE (AS BICARBONATES) & NITROGEN

SOURCE OF CHLORINE COMPOUND	CHLORINE COMPOUND WITH CAUSTIC	SODIUM CYANIDE	SODIUM BICARBONATE	NITROGEN	SODIUM CHLORIDE	WATER
1. Chlorine Gas: Cl_2	$5Cl_2 + 10NaOH +$	$2NaCN \longrightarrow$	$2NaHCO_3 +$	$N_2 +$	$10NaCl +$	$4H_2O$
2. Chlorine Water: $Cl_2 + H_2O \rightleftharpoons HOCl + HCl$	$5HOCl + 5HCl + 10NaOH +$	$2NaCN \longrightarrow$	$2NaHCO_3 +$	$N_2 +$	$10NaCl +$	$9H_2O$
3. Sodium Hypochlorite: $Cl_2 + H_2O \rightleftharpoons HOCl + HCl$; $HOCl + HCl + 2NaOH \rightarrow NaOCl + NaCl + 2H_2O$	$5NaOCl + 5NaCl + H_2O +$	$2NaCN \longrightarrow$	$2NaHCO_3 +$	$N_2 +$	$10NaCl$	

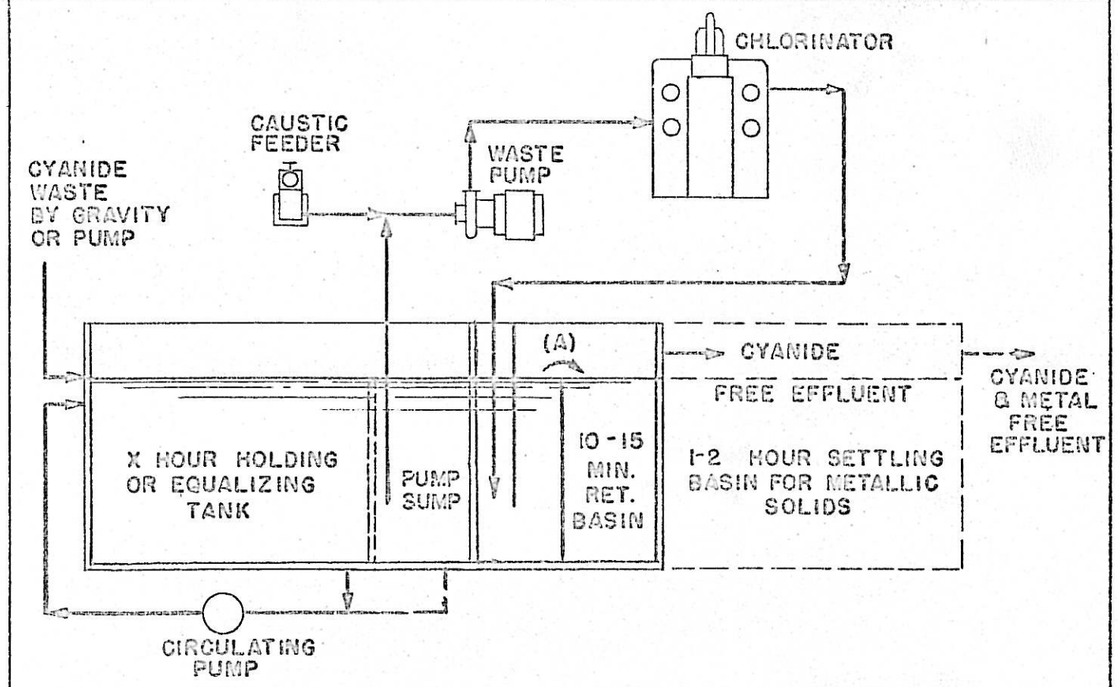
TABLE III

PHYSICAL ASPECTS OF CHLORINATING CYANIDE WASTES

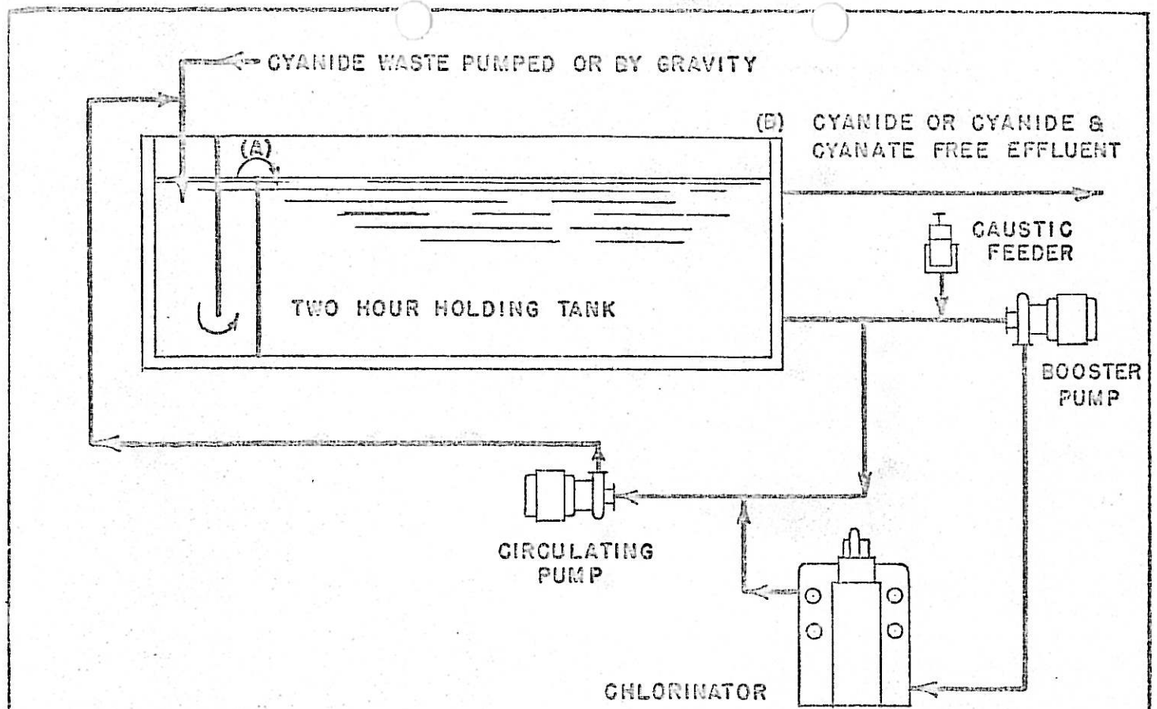
A. In "Flow-thru" Chlorination Plant (Where at least part of treated waste passes continuously thru the plant)	B. In "Batch" Chlorination Plant (Where all waste is recirculated until treatment is finished)
1. How to Consolidate Waste for Chlorination	
1. Use Holding Tank, one	1. Use Holding Tanks, two or more
2. How to Even Out Fluctuations in Cyanide Concentration	
1. Use Equalizing Tank (Same as Holding Tank above) with Recirculating Pump if necessary.	1. Not required
3. How to Even Out Fluctuations in Waste Flow	
1. Pump waste to point of chlorination.	1. Not required
4. How to Allow for Proper Chlorine Retention Period	
1. Use 10-15 min. Retention Basin if cyanides oxidized to cyanates only and metallic precipitates can go to sewage plant. 2. Use 2-hour Settling Basin if all cyanides oxidized to CO_2 and N_2 or if metallic cyanides treated. 3. Use existing Holding, Equalizing or First Rinse Tank. Latter for oxidation to cyanates only.	1. Use Holding Tanks above. Settling Basin or Lagoon should follow Holding Tank if metallic cyanides being treated, unless metallic precipitate can go to sewage plant.
5. How to Eliminate Odors about Plant	
1. Apply caustic and chlorine to form hypochlorite or its equal with their application to the waste in a closed system with good mixing.	1. Apply caustic and chlorine to form hypochlorite or its equal with their application to the waste in a closed system with good mixing.



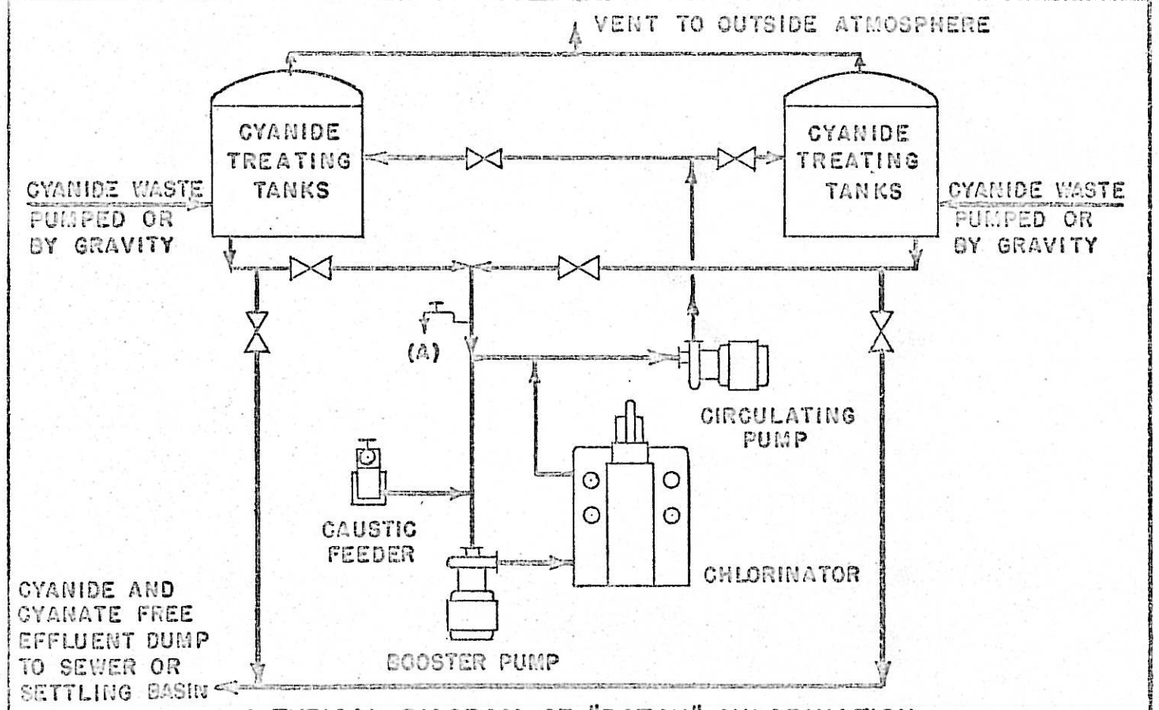
1 - TYPICAL DIAGRAM OF "FLOW THRU" CHLORINATION



2 - TYPICAL DIAGRAM OF "FLOW THRU" CHLORINATION



3-TYPICAL DIAGRAM OF "FLOW-THRU" CHLORINATION



4-TYPICAL DIAGRAM OF "BATCH" CHLORINATION

Royal W. Beeksle

February 19, 1968

Mr. Mark Jurras
Manager
Royal Typewriter Plant
2401 East Sunshine Street
Springfield, Missouri

Dear Mr. Jurras:

Since I called you the other night I have had two or three calls from people with whom the hauling of chemical wastes has been discussed. They have invariably asked us about the disposal but we have been unable to give them answers.

While I don't get too much upset by refuse haulers' statements, I would like to get the matter in tangible form so that we can decide what to do, more particularly so, since the State Board of Health has shown an unusual interest.

I hope that as soon as your plans are made that they can be discussed with personnel from Public Works. We would like to work with you.

I think that at this time I should express my appreciation of your consideration in writing letters to our personnel at the Northwest Treatment Plant. They appreciated it.

Very truly yours,

V. W. Whitfield, P.E.
Director of Public Works
& City Engineer

VWW/ec

cc: Paul Baron
Paul Hickman ✓

Royal McBee Corporation,
2401 E. Sunshine,
Springfield, Mo.

August 2, 1961.

Attention - Mr. Chester Whitlock.

Dear Mr. Whitlock:

I have received a copy of a letter to Walter Pugsley, local representative of the Portland Cement Association concerning the possibility of permitting higher pH in the industrial wastes discharged from Royal McBee.

I have read it four times but it is so full of guibbles that I am not absolutely sure what they have said. I am sure they are quite reluctant to recommend any increase in the pH of industrial wastes beyond the present ordinance until after weeks and months of testing and analysis.

I certainly do not object to any testing program your company might care to participate in and will make the manpower and chemical laboratory facilities of the City available just as much as possible but unless such tests are done and results thereunder be satisfactory, I must officially advise you that there can be no change in pH limits set forth in the Sewer Use Ordinance, copy of which is enclosed.

You are also advised that pending completion of such a program, we will have to insist that the pH limits of the ordinance be adhered to.

I am also enclosing copy of the letter from the Portland Cement Association.

Very truly yours,

ADM:ns

Allen D. Mayfield,
City Sanitary Engineer.

Enclosures.

ccs-Mr. Walter Pugsley
File (Royal McBee Industrial Wastes)

PORTLAND CEMENT ASSOCIATION
33 WEST GRAND AVENUE
CHICAGO 10, ILLINOIS

Referred_____
Answered_____

Carl J. Chappell

Missouri District Office

OF LETTER

Pugsley

General

July 25, 1961

13-3

This is in reply to your July 24 letter with the inquiry from W. E. Pugsley as to whether or not an industrial waste having a pH in excess of 10 will disintegrate concrete pipe.

The effect depends on several related characteristics and conditions of the waste in addition to pH. As indicated by Pugsley, the matter of wet and dry cycles is important. Also important is the temperature of the fluid in the concrete pipe.

However, most important is identification of the alkaline waste itself. In general, carbonates, silicates, hydroxides and most nitrates are harmless. Possible trouble may arise under certain conditions from chlorides, sulphates and ammonium nitrate.

Since various industries use these compounds, they are important in concrete sewer considerations. Presumably the problem posed by Pugsley concerns an existing concrete sewer rather than a proposed one. If so, it appears that Mrs. Mayfield is concerned about the need for pretreating the wastes from the Royal McBee plant.

If an existing sewer is involved, we should know the chemical analysis of the waste, pH range, duration of flow of the highly concentrated wastes, temperature range, volume of waste, and the volume and characteristics of domestic sewage into which the industrial waste is introduced. With that type of information, we could estimate an effect on the concrete and recommend remedies if they are needed.

It occurs to us that this waste would introduce a condition of wetting and drying cycles because of fluctuations in flow volumes every day. It isn't likely that a steady flow would occur unless the waste comes from a weir-controlled lagoon or other holding basin.

If a new sewer is proposed, we would be glad to make recommendations on design of the sewer, mix design for the concrete and linings or coatings if found to be necessary. It may be that a sulphate waste is involved and a sulphate resisting

PORTLAND CEMENT ASSOCIATION
33 WEST GRAND AVENUE
CHICAGO 10, ILLINOIS

COPY OF LETTER

cement would be helpful.

It would also be helpful to us in analyzing this problem to know the nature of the Kraft Foods wastes. It may be that another alternative may be the combination of Kraft and Royal-McBee wastes in a common holding tank prior to allowing either one to go into the city sewer.

There are so many aspects to this problem that specific information will be required before we can offer specific recommendations.

E. P. SELLNER

E.P.S.*fa

Copy to R. F. Dierking

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Mr. W. E. Hedges, Director DATE April 27, 1961.

DEPARTMENT Public Works.

On Friday, April 21, arrangements were completed with Mr. Chester Whitlock of the Royal-McBee Corporation for the disposal of two drums of cyanide and several drums of phenolic wastes. Mr. Whitlock was told that there would be a man at the Northwest Sewage Treatment Plant at 1:30 p.m. Monday, April 24, to supervise the disposal of the cyanide.

Lee Coonis has been hired by Royal-McBee to handle their trash and sludge wastes. I arranged for Paul Bailey to wait at the poison pit on the hillside above the Northwest Treatment Plant to be sure that the cyanide was dumped in the pit and the cover properly replaced. Also, on Friday I advised Mr. Walker that some drums of phenolic wastes would be brought to the landfill by Mr. Coonis and that they could be crushed and incorporated in the trash and garbage at the landfill.

Mr. Bailey remained out there all Monday afternoon and made two calls to Royal-McBee to locate Mr. Coonis, without success. Mr. Coonis 'phoned me at my home about 6 o'clock and told me that he had dumped both bads at the landfill and he had just found out he should not have done it. The men at the landfill thought he had already been to the poison pit and that all he had were the drums of phenolic wastes. The wastes were dumped on about 5 feet of trash and garbage and about 8 feet or more of garbage and trash were compacted over these wastes.

On Tuesday I received a call from Glen Harwell of the State Health Department and, later in the day, from Dr. Amos inquiring about the situation.

Acids from the decomposition of garbage will attack the sodium cyanide and tend to release cyanide gas. Mr. Walker has been advised to cover the mixed garbage and refuse with well compacted clay to reduce the hazard from the gas to employees and patrons of the landfill.

After visiting the landfill and discussing the point of disposal and the handling of the cyanide waste in the fill, I reached the conclusion that it was impractical to dig up the 8 feet of mixed garbage and refuse and try to find and dispose of the granular sodium cyanide. The bulldozer thoroughly compacted the metal drums and fibre containers and at least 8 feet more of mixed garbage and refuse was compacted over the industrial wastes.

There were two small fibreboard drums containing about sixty pounds of approximately 25% sodium cyanide. The point of disposal is over 250 feet from the creek and there is no evidence of any moisture leaching into the creek from the landfill. In fact, although the sluice gate from the final tank of the old Southwest Plant is open, the tank is full and stagnant thus indicating that the fill and undisturbed soil is rather impervious. It is, therefore, felt that cyanide may not reach the creek; but, if it does, it will leach out very slowly in

SIGNED

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF_____ DATE_____

DEPARTMENT_____

quantities too small to create hazards.

In order to prevent similar accidents, Royal-McBee will be required to handle sodium cyanide wastes and any metal wastes separately from other types of waste and one of our men will accompany these loads of poison from the Royal-McBee plant to the poison pit and oversee the disposition of the poison and make certain that the cover of the pit is properly replaced.

If these rather elaborate precautions do not prove to be satisfactory, it will be necessary to discontinue any attempt by the City to assist in proper disposal of wastes from Royal-McBee.

A. D. Mayfield
City Sanitary Engineer

ADM:ns

SIGNED A D Mayfield

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A. D. Mayfield
A. D. Mayfield
City Sanitary Engineer

ADM:ns

SIGNED_____

May 24, 1960.

Mr. J. Connelly,
Honorable Big Stinker,
Loyal Order of Manhole Sniffers,
Royal McBee.

Dear Sir:

This will acknowledge receipt of certificate acknowledging me as a qualified member in good standing of the LOYAL ORDER OF MANHOLE SNIFFERS.

I am deeply honored and appreciate your efforts. However, unfortunately, jealousy has reared its ugly head and some of my coworkers who spend far more time in and out of manholes than I do indicated they deserve such recognition far more than I do. In the interests of peace and quiet in the organization, I may have to request your assistance in obtaining similar certificates for other well qualified members.

Yours in deep appreciation,

Allen D. Mayfield
New Member, Loyal Order of Manhole Sniffers.

ADM:ns

General, suggest minimum 0.10 foot drop across each manhole.

MH #26 Stub to east should be at least 0.10 higher than sewer to west.
A grade of 0.40% for 8" VCP appears to be a little flat for industrial sewers.

MH #27 Suggest drop connection for sewer from north.

Inlet #35
E 18754 One storage yard Inlet (surface water) connected to san. sewer, Why? how large an area ~~connected to~~ tributary to it

MH # 28 Turbulence ~~will~~ may release ~~toxic~~ gases.

Suggest ~~10" p~~ grade of 10" sewer from south be increased to permit discharge with centerline of ten inch pipe level with spring line of 8 inch pipe. Fillet in MH #28 would be raised to spring line of 8 inch pipe.

10 inch pipe from north west should be diverted to a storm sewer. If it cannot be, recommend new MH ~~@~~ about 15 feet west of Inlet #35 with a drop connection to the 15 inch sanitary sewer.

MH # 29 Recommend drop connection for sewer from east with spring line ~~drop~~ lower pipe at same level of the spring line of the large pipe to the west. Build fillets to spring line of 8" pipe from south.

OK See sheet M-6

Please furnish max influent flow rate and the ~~type of~~ concentration of solids and oil ~~of wa~~ passing through detention pit.

M-7

Sewage Metering Pit

Length of ~~rectangular~~ channel appears to be too short ~~for~~ to permit ~~labor~~ turbulence ~~to be damped~~ from change of channel shape to be damped out and flow to be stabilized ahead of Parshall flume.

8" Sewer from south at E 16+04 controls depth of sewer, 2E 1333.0.

48.5
10.2
38.3

7.75
1332.53
1348.28

1335.3

~~Sewer~~ 1349.5
1335.3
14.2

1332.53
2.75
1335.28

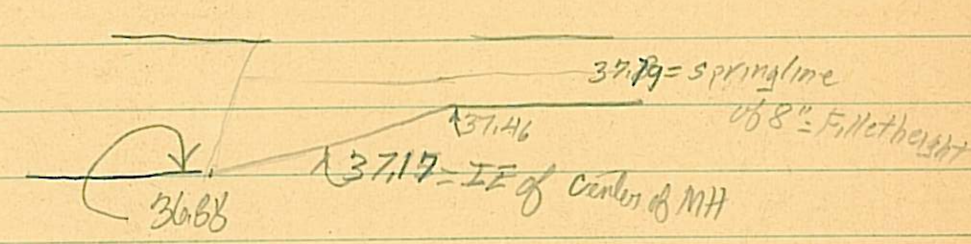
10' 2/2
25/12 = 2

Invert elevations shown on sheet M-5 do not coincide with those on sheet M-6 for sewage metering pit. In addition, Sec. CC on sheet M-6 shows a higher elevation out going than incoming. Dimensions in Section BB are contradictory.

It is felt that this metering pit will be dangerous to inspect and maintain. It is about 15 feet from the manhole lid to the working platform. ~~Any~~ Toxic gases or vapors would be hard to remove from the pit as proposed.

37.79
37.17
.62

37.79
.42
37.37



39.50
39.37
2.13 = increase in fall of 10" sewer from south

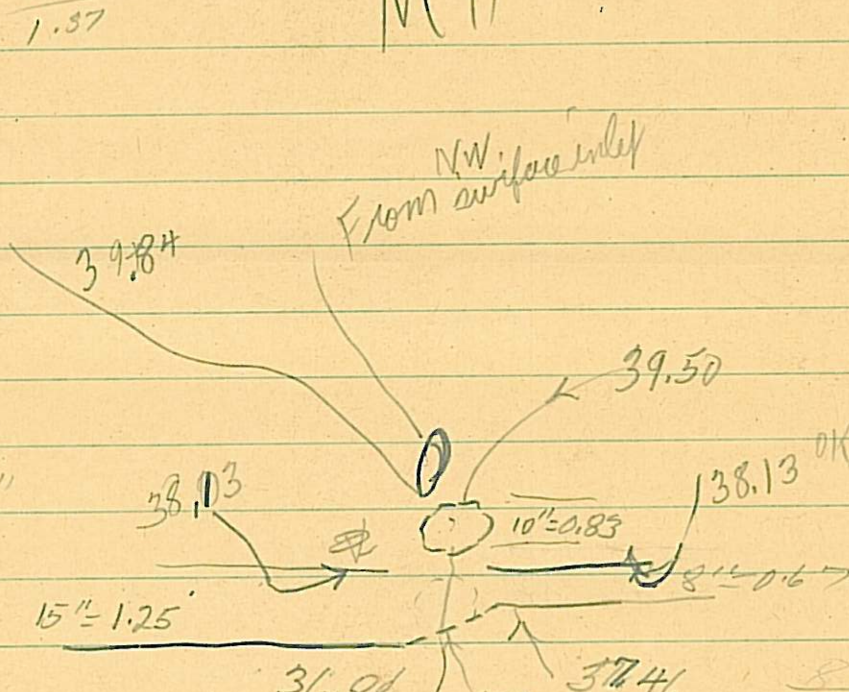
38.13
.83
37.30

38.67
37.30
1.37

MH #28

37.46
36.88
2) .58 (.29

36.88
.29
37.17
I.E. of center of MH



15"
12.43"

39.50
37.17
2.33
max drop of S. sewer

36.88
0.63
37.51 = Springline of 15"

38.67 from S.
+.83
39.50

.833
6) 5.00

.33
37.18 = I.E. of possible 8" drop pipe from 10"
3.00
40.18

37.09

It is recommended that a suction fan with above ground controls be provided or other ventilating improvements.

angles ~~will be float and bars~~ will be exposed to corrosive liquids and the meter to water and other vapors. ~~Vapors~~. Corrosion resistant materials will be essential.

Tapered fillets in bottom corners are suggested ~~to~~ form transition sections from channel to pipe and from pipe to channel and to eliminate sludge catching pockets.

Sanitary sewer
Drop manhole.

Recommend manhole bottom slab be extended to at least six inches beyond encasement to facilitate support of drop system.

Thank you for your letter of August 28, 1958 discussing my preliminary analysis of industrial wastes to be anticipated from the Royal McBee typewriter plant.

I agree that the information provided by Hiffels and Rozzelli in their July 15 letter is of little value in determining the quantities of waste. In the absence of such information, the preliminary analysis was made as an attempt to estimate the maximum loads and concentrations of toxic materials that the sewers and treatment processes could stand.

We are happy to learn that you think these maximum quantities in the preliminary analysis are far in excess of the probable quantities of toxic wastes from Royal McBee.

We are informed that Royal McBee is analyzing wastes at their existing plant and will furnish data. In addition, Mr. F.F. Behm of Royal McBee is expected to come to Springfield this week to discuss this matter. However

May 25, 1959

Dear Sir:

We hereby acknowledge the receipt of: **Plan for Springfield, Mo. Royal McBee Corp. Portable Typewriter Plant's industrial wastes treatment facilities.**

Our review will be completed and reported to you in the near future.

Very truly yours,

Jack K. Smith

Jack K. Smith, Executive Secretary
Water Pollution Board
State Office Building
Jefferson City, Missouri

Royal McBee Ceremony Set

Governor to Attend Dedication June 7

Gov. James T. Blair will head a list of dignitaries expected in Springfield June 7 for formal dedication of Royal McBee Corporation's new Springfield plant.

The $5 million facility, world's largest plant devoted exclusively to the manufacture of portable typewriters, will be the center of attraction during a three-day program here.

* * *

Blair will be joined here by a number of state, city and county officials and Royal McBee executives led by Board Chairman Allan A. Ryan. Dedication ceremonies will take place at 1 p.m. in front of the new structure.

The day before—on Monday, June 6— the company will observe Family Day with an open house for families of the more than 1000 employes of the Springfield plant.

* * *

Dedication Day June 7 will be followed by an open house for customers and for friends of the company's employes, Kenneth C. Begg, general manager of the plant here, said. And on Wednesday, June 8, Royal McBee will hold open house for the general public.

Dedication of the new plant will take place almost three years from the day Royal McBee officials first visited Springfield to investigate the city as a possible site for its domestic portable typewriter center. Construction began in September, 1958, and the company moved into the structure last August.

A second manhole or access hole is suggested over long axis of pit and just clearing baffle on discharge side. This would facilitate removing solids in the discharge chamber and permit ~~clearing unstopping~~ clearing the discharge pipe.

Sht 107

Future extension east is indicated. East part of sanitary sewer is too shallow for much extension.

Sheet 116 - Acid proof tile for Floors, drains, etc ; expect corrosive condition

Water Treatment Equipment pp 41-36 thru 41-39

Are the Dealkalizers regenerated by using acid? NO What will the brine do to the corrugated metal pipe in the storm sewers? What will it do to creek through Galloway and the Fish hatchery?

Boilers each max capacity 36,000 # steam/hr

continuous Blowdown.

1% of total evap – 360 # H2O/hr

or 43 gal/hr

43.7
833 36000
3337
2680
2499
1810

24
172
86
1032 gal/day/boiler max.

Page AA-12

Jointing Materials for Vit. Clay Bell & Spigot Pipe

Comments by our consulting engineers indicated serious difficulties were encountered in obtaining tight joints with pre formed bituminous joints. Recommend

Recommend polyvinylchloride premolded type joints or equal to city sewer.

It is felt that the type of material and joint compound proposed for the plant laboratory drain should be reviewed.

as you ~~can~~ can see from the attached copy of a letter from Riffelo and Rossetti, ~~that~~ toxic wastes will be dependent on manufacturing and process layout ~~and these are~~ which is subject to change.

We gave Royal McBee officials and Mr. Chapoton of Riffelo and Rossetti copies of the Sewer Use Ordinance during their first conference with us in January of this year. We will also furnish Royal McBee Engineering Department copies of this ordinance as you suggest.

Neal McBee
Industrial Waste

GEORGE L. Nankervis COMPANY

Telephone: VERMONT 8-5780

METAL FINISHING EQUIPMENT

15300 FULLERTON AVENUE
DETROIT 27, MICHIGAN

June 10, 1959

City of Springfield
Department of Public Works
Springfield, Missouri

Attention: Mr. Allen D. Mayfield
City Sanitary Engineer

Subject: Royal Typewriter Company

Gentlemen:

We have received a copy of your letter of May 22, to Mr. F. F. Behm at the Royal Typewriter Company. We have discussed the contents of this letter with Mr. Behm, and he has requested that we clarify certain items as requested in your letter.

The control of the cyanide content of the effluent will depend on the conductivity detector and over-chlorination. Our experience with our waste disposal package indicates that this mode of operation has been successful; however, we do not have further control of the effluent. If additional control would be required, it would be necessary to install an oxidation reduction meter, which we do not recommend because of high electrode maintenance.

Complete control of the chromator will involve an oxidation reduction control and a PH control in the final stages. In our present plans, we propose to use conductivity detectors only.

In your letter, you question the combined capacity of the pumps, which is 2400 gallons per hour when they are both in operation, compared to the volumetric capacity of the retention tank. Under normal flows we would obtain one-hour retention time, which includes considerable safety factor. We feel that even if the peak flow should reach 2400 gallons per hour at a sustained period, 20 minutes retention time would still be adequate to convert the cyanide to cyanate, since this reaction is almost instantaneous.

In our system, we propose to use 16% sodium hypochlorite which contains 1.3# of chlorine per gallon of solution. We will inject the hypochlorite at a maximum rate of 6 gallons per pound of cyanide. The maximum concentration of the cyanide entering the disposal unit is approximately 2# per 600 gallons.

City of Springfield

June 10, 1959

The PH of the effluent will vary; however, past experience indicates that the maximum PH variation will be between 8 and 11. The PH will probably be 9 or 10, but exact values cannot be predicted at this time.

In many operations, our cyanizer has completely destructed the cyanide. However, in this case we can predict complete conversion to cyanate.

Usually, the sludge from cyanide wastes will contain complex metal radicals. This sludge must be periodically removed and transported.

We do have facilities for sludge removal in our chrome treatment system. Also, the discharge from the chromator is accomplished through a weir.

We hope that we have adequately answered all of the questions which you have submitted. If we can be of further service, please call upon us.

Very truly yours,

GEORGE L. NANKERVIS COMPANY

A. J. Giaier

A. J. Giaier

AJG:mlm

cc: Mr. Behm and
Mr. Flannery - Royal Typewriter Company

Royse ; McB + D
Ind. Wastes

July 1, 1959.

Mr. Edward Lightfoot, Chief,
Stream Pollution Control,
Bureau of Public Health Engineering,
Missouri Division of Health,
Jefferson City, Missouri.

Dear Mr. Lightfoot:

I am forwarding you today under separate cover the two volumes of "Sewage Works Journal" which you so kindly sent me, and would like to thank you for your assistance in our investigation of toxicities.

Very truly yours,

Allen D. Mayfield
City Sanitary Engineer

ADM:ns

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Industrial Wastes DATE 6-16-59

DEPARTMENT Royal McBee Corporation

MEMORANDUM

The attached letter was not signed and mailed. Mr. Avery stated that he felt the subject had been covered adequately in correspondence and 'phone calls; and that the Royal McBee people were under such a strain that the only thing the letter would accomplish would be to cause a "fine blazing row". The Royal McBee people might well feel that a review of the subject would cause unnecessary delay.

ADM:ns

SIGNED A. D. Mayfield, Sanitary Engineer.

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Mr. W. B. Avery DATE June 16, 1959.

DEPARTMENT City Manager

A draft of a letter is attached which you may care to use to put the City on record that pretreatment systems and protective devices which the Royal McBee Corporation use must work satisfactorily or they will be required to make any changes that are found to be necessary.

ADM:ns

SIGNED A D Mayfield
A. D. Mayfield, Sanitary Engineer.

CITY OF SPRINGFIELD

OFFICE OF THE CITY MANAGER

SPRINGFIELD MISSOURI

A I R M A I L

June 16, 1959.

Mr. F. F. Behm,
Facilities Planning Engineer,
Royal McBee Corporation,
150 New Park Avenue,
Hartford 6, Connecticut.

Dear Fritz:

This letter will confirm our 'phone conversation of June 10, 1959.

We have had frequent conferences and much correspondence concerning control of the pH of the wastes from your new plant and similar communications concerning pretreatment of some of the toxic wastes from the plant.

You have objected to several of our recommendations and requests and insisted that the facilities which you have proposed are entirely adequate.

Reference is made to Section 3 of Article III, commonly known as THE SEWER USE ORDINANCE of the City of Springfield, Missouri, a copy of which is enclosed.

Recommendations and requests which the City has made have been directed towards obtaining compliance with this section. The intent of this section is very plain; no person shall discharge or cause to be discharged to the sewer any waters or wastes containing any substance in sufficient quantity to damage or create hazard to structures or equipment of the sewage works or in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, or create any hazard in the receiving waters of the sewage treatment plant.

We have had serious doubts that the control system and the treatment system as proposed by your company would sufficiently reduce the discharge of corrosive or toxic wastes to comply with the intent of the ordinance. Your company has insisted the proposed plans would do so.

You are hereby notified that the Royal McBee Corporation must provide sufficient pH control and treatment of toxic wastes as to comply with the

stated intent of the ordinance and should the proposed controls prove to be inadequate, you will be required to make such changes without delay as we feel are necessary to protect the sewage works, processes and the receiving stream.

We sincerely hope that the proposed control system and the treatment system prove to be entirely adequate. If it does not, the City of Springfield will suffer appreciable costs for repair of damage or costs of restoring processes to normal operation and the Royal McBee Corporation will, also, lose production time plus the extra cost of modifications.

It appears that your company should develop sampling procedures, testing and records to make certain that the City and the company have full knowledge of the success of the industrial wastes controlling and processing.

Sincerely,

W. B. Avery
City Manager

WBA:ns

SECTION 3 - ARTICLE III

No person shall discharge or cause to be discharged any of the following described waters or wastes to any sewer or natural outlet:

(a) Any liquid or vapor having a temperature higher than 150 Degrees (150°) F.

(b) Any water or waste which may contain more than 100 parts per million, by weight, of fat, oil, or grease.

(c) Any gasoline, benzene, naptha, fuel oil, or other flammable or explosive liquid, solid or gas.

(d) Any garbage that has not been properly shredded.

(e) Any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure, or any other solid or viscous substance capable of obstruction to the flow in sewers or other interference with the proper operation of the sewage works.

(f) Any waters or wastes having a pH lower than 5.5 or higher than 9.0, or having any other corrosive property capable of causing damage or hazard to structure, equipment processes, and personnel of the sewage works.

(g) Any waters or wastes containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, or create any hazard in the receiving waters of the sewage treatment plant.

(h) Any waters or wastes containing suspended solids of such character and quantity that unusual attention or expense is required to handle such materials at the sewage treatment plant.

(i) Any noxious or malodorous gas or substance capable of creating a public nuisance.

our copy

June 4, 1959.

Mr. A. J. Gisler,
Chief Engineer,
Metal Processing Section,
Geo. L. Mankervis Company,
Detroit, Michigan.

Dear Mr. Gisler:

In accordance with our long distance 'phone conversation today, we are rushing you a copy of our letter to Mr. Behm dated May 22, 1959, concerning the proposed package units for treatment of cyanide and chromate wastes and, also, a copy of our Sewer Use Ordinance.

Some of the points you have covered in our discussion of the cyanide treatment unit. You have suggested that you could study the letter and questions raised in our 'phone conversation and provide similar information concerning the chromate unit.

We will study the information received by 'phone and probably send you a letter based on our analysis of this information, with copies to Royal McBee.

We thank you for your assistance in this matter.

Very truly yours,

Allen D. Mayfield
City Sanitary Engineer

ADM:ns

cc-Mr. F. F. Behm

June 4, 1959.

Mr. S. B. Chapoton,
Giffels & Rossetti,
Marquette Building,
Detroit 26, Michigan.

Dear Mr. Chapoton:

We have received your letter of June 1, 1959 on June 3, 1959 and this letter will confirm our 'phone conversation of June 4, 1959 regarding your letter of June 1 and other correspondence relating to the pH control system for the Royal McBee Typewriter Plant.

I have considered the points raised in your letter very carefully and understand your reluctance to shift the discharge point of the neutralization tank drain. But, the potential hazard to the City sewer system from undetected discharge of inadequately treated waste appears to require this shift.

You are hereby notified that:

> The drain from the neutralization tank must return to the acid-alkali sewer at a point above the pH sensing instrument manhole.

In order to permit discharge of treated wastes during an emergency when the collection system is filled with excessively acid or alkaline wastes, we will approve a valved connection from the neutralization tank or its drain direct to the sanitary sewer provided the valve has some simple arrangement for installing a light type seal similar to a meter wire and seal. Whenever the valve was opened, the seal would, of course, be ruptured and the ruptured seal would serve as notice that the emergency bypass had been used. This office would reseal the closed valve on notification by Royal McBee. Thus, under normal conditions, treated wastes would be monitored and then, if adequately treated, be discharged to the sanitary sewer. The emergency bypass outlined above would accomodate possible emergency conditions.

In Item 2 of your letter you have repeated the statement that the A-A system will function separately from the raw and treated cyanide and chrome wastes. After our 'phone call to you, we called the Geo. L. Nankervis Company who are preparing package treatment units for cyanide and chromate wastes. It appeared to be news to them that the pH of the treated wastes would have to be controlled within the frequently repeated limits of 5.0 to 9.0. The reported operating procedure for these units would involve discharges at the rate of 120 gallons per minute for 5 minutes or more. In

emergencies, the discharge could reach 240 gallons per minute for as long as needed. As we have stated in our review dated May 22, 1959, the pH of the treated toxic waste will have to be monitored and controlled. We believe that decisions concerning the method whereby such effluent is controlled to acceptable limits is a matter for Royal McBee and its consultants to decide. We will, of course, need the plans, and the basic data for the proposed pH control system of effluent from these package units.

In Item 3 of your letter you have referred to the fact that an employee, by the flip of a switch, can make the whole system incapable of performing any function. This is quite true and unavoidable. However, such switch should be located where supervisory personnel can be aware that the switch has been flipped. More importantly, the switch should be arranged so that the recording device will record periods during which this system is not in operation.

We feel that Royal McBee is just as interested in the satisfactory operation of this system as the City is and that unauthorized bypassing of the system would be readily detected and effectively discouraged by Royal McBee supervisors.

In Item 4 of your letter there is appreciable discussion as to the time available for treatment in the neutralization tank. The amount of time available for treatment and the methods of providing for such time are actually matters to be decided between Royal McBee and its consultants. The City becomes interested in the matter only when there may be so little time provided that the control system threatens to become an obstacle to continuous plant operations.

In our letter of May 22, 1959 we requested extra leads be provided in the conduit and an extra sleeve be constructed to facilitate installation of an additional water level detector should such detector be needed at a later date. We are quite willing to modify this request as to a more general type of request:

> Provisions must be made to permit adequate time for testing and treatment of waste in the neutralization tank.

Items 5 and 6 are the responsibility of the Royal McBee Corporation.

The requirements in this letter have been discussed with City Manager Avery and he has authorized me to write to you direct in the interests of saving time.

If you have any questions, please feel free to 'phone and I will try to answer them.

Yours truly,

A. D. Mayfield
City Sanitary Engineer.

ADM:ns
ccs-Mr. F. F. Rehm
Mr. A. J. Glaier
Mr. Jack Smith

GIFFELS AND ROSSETTI
ARCHITECTS • ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

June 1, 1959

City of Springfield
Springfield, Missouri

RE: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Port Chester, New York
Our Job No. 57-166

Attention: Mr. William E. Hedges,
Director of Public Works

Gentlemen:

This is a reply to your letter of May 22, 1959.

Please refer to Mr. A. D. Mayfield's I.O.M. of May 22, 1959.

Item 1 - The discharge of the 6" effluent from the neutralization tank to a point above the pH sensing instrument manhole will require:-

a. Raising the tank 1'-6" to permit the new gravity drain to clear the existing drain lines.

b. A control to restrict the flow to not more than 300 g.p.m. so the system is not flooded at the time the contents of the tank are released.

This waste treatment system and any other sewerage and/or treatment systems are always under the control of competent operating and laboratory personnel.

This system has the capability of automatically collecting the acid-alkali waste not acceptable to the City and provision for treatment. We believe the system is adequate to the degree required relative to the apparently neutral wastes anticipated.

Item 2 - The A-A system will function separately from the raw and treated cyanide and chrome wastes.

Item 3 - The neutralization tank waste discharge can be relocated to the location requested. However, our objections in Item 1 still apply in view of the fact that an employee, by the flip of a switch, can make the whole system incapable of performing any function.

GIFFELS AND ROSSETTI ARCHITECTS · ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

Item 4 - The installation of another water level indicator seems unnecessary. However, a combination can be provided to sound the alarm and signal with red light at elevation 1348.00' (1.58 feet giving 3 minute warning) and pump would stop when liquid reached elevation 1349.58'.

The interval between this first warning and complete shutdown of the processing manufacturing would be:-

3 minutes (1500 gal. ÷ 500 g.p.m.) between 1st alarm (red light) and stopping of pump.
6 minutes (4 feet = 1500 ÷ 250 g.p.m. max. flow) to fill pump pit (green light).
5 minutes to fill lines back to plating pits.

Total of 14 minutes

Item 5 - Royal McBee do understand that the process manufacturing will have to be shut down for the conditions of system failure.

Item 6 - Royal McBee will have to make the decision on the stocking of replacement parts.

Yours very truly,

GIFFELS AND ROSSETTI

SBC:mk

S. B. Chapoton

CC: Royal McBee Corporation
Mr. F. F. Behm

May 22, 1959.

Mr. F. F. Behm,
Facilities Planning Engineer,
Royal McBee Corporation,
150 New Park Avenue,
Hartford 6, Connecticut.

Dear Mr. Behm:

We received your letter, a schematic diagram of the chrome and cyanide treating system with description April 27, 1959.

We are aware that alkaline chlorination of cyanides has been practiced successfully in many plants and that reduction of chromates to the trivalent form by the use of sodium metabisulfite has, also, been used by some plants.

Although only a schematic diagram was provided, certain features need to be commented upon at this time.

Control of toxic content of effluent appears to depend on measurements of cyanide content of rinse water ahead of the treatment unit. The reviewer can see that the conductivity detector and controller as shown can maintain a fairly constant cyanide content in the rinse tanks by adding clear water to dilute and flush out excessive quantities. But it is by no means clear that the system will assure adequate treatment and thus a satisfactory effluent.

The writer has the same doubts concerning the control of the effluent quality by the same type of device in the chromate treatment system.

Cyanide wastes are reported to flow at the rate of approximately 800 gallons per hour and the treatment equipment will have a capacity of 800 gallons per hour. But the pumps can discharge 2400 gallons per hour. Thus, the detention and reaction time can be reduced to 20 minutes. It is, therefore, requested that Tank T-3be increased in size to 1600 gallons measured below the overflow level of the tank.

It is requested that arrangements be made to insure that the hypochlorite injection is proportional to the cyanide concentration of the influent.

It is felt that the designers should furnish more complete basic data as follows:

The designers should state:

A. How many pounds of chlorine will be injected per pound of cyanide?
B. What is the strength of the sodium hypochlorite and the pH of the solution?
C. What is the maximum concentration of cyanide permitted in the effluent?
D. What is the maximum concentration of cyanates permitted in the effluent? The maximum pH of the effluent?
E. What control devices will be provided to insure that only acceptable effluent is discharged?
F. What will the sludge contain? What will be done with it?

The size of the treatment tank for chromate reduction and acid neutralization does not appear to be in proportion to the reported capacity of the pumps.

Both treatment units are shown with discharge points near the bottom of the treatment tanks and connected to an unidentified "sewer". It is realized that this is only a schematic diagram but treatment tanks will be required to have overflow discharge. Drains must discharge into the acid-alkali sewer upstream from the pH control system.

In the description of the chromate unit, no reference is made to sludge removal. It appears that adequate treatment will require precipitates be settled and sludge removed and only clarified effluent be discharged. Only cyanide and chromium were mentioned. The Royal McBee Corporation should advise us in writing what will be done with the other heavy metal rinses and plating baths.

The designers should also furnish the same type of information on the chromium treatment as was requested for the cyanide treatment such as rate of application of sodium metabisulfite, maximum concentration of heavy metals and their valence and particularly what control devices will be provided to assure that only acceptable effluent is discharged.

We would appreciate receiving basic data concerning the chemistry of the processes and an outline of effluent quality control devices even before actual plans are submitted.

Your assistance in this matter will be appreciated.

Very truly yours,

A. D. Mayfield,
Sanitary Engineer

ADM:ns
ccs- Mr. S. B. Chapoton
Mr. Jack K. Smith

SEQUENCE OF OPERATION
FOR
WASTE DISPOSAL SYSTEM

The Waste Disposal System which we propose will be a continuous system for handling three separate wastes. See George L. Nankervis Company Drawing #10158, Waste Disposal System for Royal Typewriter Company.

Cyanide Wastes

The cyanide wastes will be processed by the George L. Nankervis Company Model 5769 Cyanizer. The wastes will be received from the rinse tanks. The cyanide wastes will flow at a rate of approximately 800 GPH. The waste processing equipment will have a capacity of 800 GPH.

The wastes from the rinse tanks will be manifolded and transmitted by gravity to Tank T-2, the Interceptor, having a volumetric capacity of 300 Gal. The waste will be pumped from the Interceptor by either one of the two pumps P-1 or P-2, each having a capacity of 20 GPM. These pumps will be arranged for alternate operation with provision for both pumps to be put in operation if the flow should exceed the capacity of one of the pumps.

Pumps P-1 or P-2 will pump the waste to Tank T-3 where Sodium Hypochlorite will be injected at the rate of approximately three (3) gallons per pound of cyanide. The Sodium Hypochlorite will be added at a fixed rate, determined by adjustment. Tank T-3 will be a specially designed baffle tank which will hold the waste for a period of one hour to convert it to cyanate. The processed wastes will then be transmitted to the sewer.

Provision will be made in Tank T-3 for removal of sludge. The cyanide content of the rinse waters will be held approximately constant by means of conductivity control B-1 at each rinse tank. When the contamination in a rinse tank exceeds a certain fixed amount, the conductivity control will energize a solenoid valve which will add water until the liquid in the rinse tank has been clarified.

CHROME WASTES

The chrome wastes will be processed by a George L. Nankervis Company Model #3340 Chromator. The chrome wastes will be received from the Chrome Rinse Tanks. This waste will flow by gravity at the rate of 600 GPH into the Interceptor Tank T-7, which has a volumetric capacity of 300 gallons. The waste will be pumped from Tank T-7 to Tank T-8 by means of either pump P-3 or P-4. These pumps are arranged for alternate operations with provision for operating both pumps if the flow exceeds the capacity of either of the pumps.

In Tank T-8 Sulphuric Acid and Sodium Metabisulphite will be added in the first zone, from Tank T-4 and Tank T-5. These ingredeients will be passed through a one-half hour retention zone in Tank T-8. Immediately after this zone, 50% concentration Sodium Hydroxide will be added from Tank T-6, and at this point Mixer M-2 will flash-mix this combination to insure adequate mixing. The Sodium Hydroxide will be held with the wastes in the next zone for a two-hour retention period, after which the waste will be passed to the sewer.

Sulphuric Acid, Sodium Metabisulphite and Sodium Hydroxide will be added at a fixed rate. Each rinse tank will be equipped with conductivity control B-2. These controllers will add water to the rinse tanks only when the contamination of the rinse tanks exceeds a fixed amount. Water will be added until the contamination level has been reduced to a set value.

May 22, 1959.

AIR MAIL

Mr. S. B. Chapoton,
Giffels and Rossetti,
Marquette Building,
Detroit 26, Michigan.

Dear Mr. Chapoton:

I am enclosing a copy of our Sanitary Engineer's review of your letter dated April 28, 1959 and prints of Waste Treatment Facilities. For some reason, the prints were not received until May 13, 1959.

Please note: (1) The comments concerning the discharge of treated strong wastes through the pH control system; (2) The repeated request that the effluent from the neutralization tank be discharged into the acid-alkali sewer at or upstream from the pH control manhole; (3) Other requests in the enclosed report.

When the requested changes are made and the requested information is furnished, we will be happy to review the plans. If you have any questions, please feel free to ask them.

Very truly yours,

W. E. Hedges
Director Public Works

ADM:ns
cc-Mr. F. F. Behm
cc-Mr. J. K. Smith

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Mr. W. E. Hedges, Director DATE 5-22-59

DEPARTMENT Public Works

REVIEW OF PLANS AND INFORMATION
FOR pH CONTROL SYSTEM

ROYAL MCBEE TYPEWRITER PLANT

Letter was received May 4, 1959, but prints were not received until May 13, 1959.

The writer was impressed by these plans for pH control system. The designers developed a simple yet ingenious system to handle a difficult problem. The system should be quite inexpensive to construct when compared to systems provided at other plants for pH control. But the small yet important changes listed under "Conclusions and Recommendations" were considered necessary to provide more protection from human frailties and mechanical mishaps.

CONCLUSIONS AND RECOMMENDATIONS

1. Effluents from the proposed cyanide and chrome wastes collection and treatment systems will have to be discharged into the acid-alkali sewer above the pH manhole or be provided with a separate pH monitoring and control system.

2. Giffels & Rossetti should review their design for the effects which treated cyanide and chrome wastes may have on the safety and capacity of the Giffels & Rossetti pH control system.

3. As previously requested, the drain from the neutralization tank should return to the acid-alkali sewer at or above the pH control manhole to prevent discharge of inadequately treated waste to the main sewer.

4. A sleeve and electrical leads should be provided to facilitate installation of a second water level indicator at a lower level in the neutralization tank. This indicator would insure that the operator would have time to treat the waste before flooding could occur.

5. If dual facilities are not provided, metal finishing operations must be shut down if repairs are needed in the pH control system during periods of production. This conclusion has been stated earlier.

6. If dual facilities are not provided, at least one each of the essential components or parts of the system should be stocked at the Springfield plant as a routine safeguard. These parts and components should be in operating condition. Exact duplication would not be necessary provided the spare would permit the system to function satisfactorily for the days or weeks required to obtain replacement parts or units. A similar request was made April 22, 1959.

Respectfully submitted,

ADM:ns

SIGNED A.D. Mayfield
A.D. Mayfield, Sanitary Engineer

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Mr. W. E. Hedges, Director DATE 5-22-59

DEPARTMENT Public Works

REVIEW OF PLANS AND INFORMATION
FOR pH CONTROL SYSTEM

ROYAL MCBEE TYPEWRITER PLANT

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4. A sleeve and electrical leads should be provided to facilitate installation of a second water level indicator at a lower level in the neutralization tank. This indicator would insure that the operator would have time to treat the waste before flooding could occur.

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6. If dual facilities are not provided, at least one each of the essential components or parts of the system should be stocked at the Springfield plant as a routine safeguard. These parts and components should be in operating condition. Exact duplication would not be necessary provided the spare would permit the system to function satisfactorily for the days or weeks required to obtain replacement parts or units. A similar request was made April 22, 1959.

FINDINGS, COMMENTS AND QUESTIONS

The letter stated that the system would be limited to acid and alkali wastes detailed in Mr. Chapoton's letter of April 28, 1959. A schematic layout of the proposed cyanide and chrome wastes collection and treatment systems was received from Mr. Behm.

SIGNED

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF_____ DATE_____

DEPARTMENT_____

pH control of the effluents from these systems appeared to be necessary. Therefore, these systems must be discharged into the acid-alkali sewer upstream from the pH control manhole. Mr. Chapoton should be advised of this requirement because it may affect the design of the pH control system, particularly safety features and capacities. If a satisfactory separate monitoring and control system is provided for the effluents from the package treatment units for toxic wastes, these effluents need not be discharged through the acid-alkali sewer.

The letter of April 28, 1959 states-

> "The additional run of 6" PVC pipe from the neutralization tank to the new A.A.M.H. seems to be an unjustified expense. The neutralization operations will be performed by competent personnel who will make a complete test and will only release satisfactory wastes."

The writer has studied the design as shown with much concern because it is true that Royal McBeen officials have demonstrated good intentions by spending rather large sums of money to protect the City sewerage system. But, these officials cannot keep the system under observation. Thus, the purpose of the protective system can be defeated by the simple act of a careless or disgruntled employee. All he has to do is lift the lever on the discharge valve of the neutralization tank and as much as ten thousand gallons of inadequately or untreated solution would quickly disappear into the sewer system. There is little chance that such acts would be detected by plant or city officials as the tank is outside the building. The City has had years of unhappy experiences in futilely tracing even larger dumps of milk products.

It is, therefore, requested that the drain from the neutralization tank be discharged into the acid-alkali sewer at a point which will allow the sensing device in the pH control manhole to examine such discharge and divert any inadequately treated material back to the neutralization tank for further treatment.

Although the total capacity of the pH control system appeared adequate for the reported flows, the use of only one high water level indicator could lead to trouble. As the writer understands the operation outlined on Sheet M-1, persons in the building will have little knowledge of the liquid level in the neutralization tank until the tank is visited or the tank high water alarm sounds. When the alarm sounds, the pump will have been in operation and the liquid level in the pump pit will be above the low water level. Thus, at the moment the tank high water alarm sounds, there will be, at the most, 1500 gallons of designed capacity in the pump pit for diverted acid or alkaline wastes. Flows were reported to total 225 gallons per minute from the finishing area drain system. Thus, the pump pit alarm would sound in not more than seven minutes if excessively acid or alkaline flows were occurring at the reported rate of 225 gallons per minute. And, in a quite short time, the acid-alkali sewer would overflow at the manhole or the floor drains.

SIGNED_____

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF_____ DATE_____

DEPARTMENT_____

Addition of effluent from package units might shorten the elapsed time before overflow. Whether the reported flows were maxima or averages, there appears to be very little time available for neutralization of a full tank. In addition, it appears that the moment the high water detector is de-energized by draining a few inches from the neutralization tank, the pump will resume pumping excessively acid or alkaline liquid into the draining tank, possibly offsetting treatment. This pump pit liquid would be added at the rate of 500 gallons per minute. Thus, it appears that a second water level indicator at a lower elevation will be needed to notify the operator in time for him to complete adequate treatment before flooding could occur. The pH control system would prevent the wastes which would be pumped into the treated contents of the draining tank from raising or lowering the pH of the tank effluent beyond acceptable limits.

Giffels & Rossetti should provide answers to the following questions:

Can the normally open by-pass valve be opened or closed manually or by hand operated control device?

Can the normally closed influent valve be opened or closed manually or by hand operated control device?

Are flows reported in Mr. Chapoton's letter of April 16th maxima or average?

The following questions are believed to be for confirmation of verbal information furnished by Mr. Chapoton -

UNDERGROUND PLAN, SHEET M-101

1. Will there be wastes containing acids, alkalis or toxic materials discharged into floor and other drains in Fa F-19-20-21, FE -19-20-21 areas? These drains are connected to a sanitary sewer rather than the AA sewer.

2. Will anything but clean water be discharged into drains in areas EDa-19-20-21 and ED-15-16a? These drains are connected to storm sewer.

Mr. Chapoton's letter of April 28, 1959-

INDUSTRIAL WASTE PUMP PIT

Our request for dual pumps was met by statement that operations would be shut down to permit maintenance and repairs. If dual facilities are not provided, the finishing operations will have to be shut down if pump or other control devices fail during such operations. Valves were well identified and operation explained by latest plans.

SIGNED_____

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF_____ DATE_____

DEPARTMENT_____

Request for positive ventilation of pump pit was declined on basis of absence of toxic gases or vapors. The need to discharge effluent containing cyanates and probably some cyanides from the package treatment unit through pH control system should be justification for Giffels & Rossetti to review the possible operating hazards in the pump pit.

General: Request for stocking replacement units in operating condition was refused. As duplicate facilities will not be provided and sources of supply are out of state, the request is repeated that one each of the following units be stocked at the plant in operating condition:-

(1) pH electrode
(2) 10" hydraulically operated solenoid pilot controlled diaphragm globe valve
(3) 500 gallons per minute pump, Buffalo No. 5 CMV or equal
(4) Motor capable of operating pump
(5) Any other essential parts or components of the pH control system. Neither the City nor Royal McBee should be faced with a shutdown of days or weeks awaiting receipt of repair parts for the pH control system.

The writer agrees with Mr. Chapoton that the system provides considerable opportunities for self-neutralization of flows. Earlier comment by the writer concerned "chattering" of valve controls, which might be caused by rapid fluctuations of the pH of the flow through the AA sewer.

It was noted that the rinses alone appeared to exceed the estimate of the total volume of metal finishing waste set forth in Mr. Behm's letter of September 10, 1958.

Hydraulically operated valves can be accepted because the plans provide a complete separation, including air gap, between City water and the "non-potable water system".

Laboratory for control of metal finishing operations was clearly shown on plans.

Respectfully submitted,

ADM:ns

SIGNED A.D. Mayfield
A.D. Mayfield, Sanitary Engineer.

May 22, 1959.

AIR MAIL

Mr. S. B. Chapoton,
Giffels & Rossetti,
Marquette Building,
Detroit 26, Michigan.

Dear Mr. Chapoton:

A copy of the complete report on "REVIEW OF PLANS AND INFORMATION FOR pH CONTROL SYSTEM - ROYAL MCBEE TYPEWRITER PLANT" is enclosed.

There are several matters that will probably be of interest to you, particularly my analysis of time available for treating a full tank and the problems which may arise from excessively acid or alkaline liquids stored in the pump pit, and possibly in the acid-alkali sewer.

I realize that you probably have information which insures that the time limits estimated in my analysis are much too short but you must realize that I do not have such information and had to rely on figures which you reported.

In addition, there are certain questions we would like to have answered.

The full report has not been forwarded to Mr. Behm. Please feel free to forward copies if you so desire.

Very truly yours,

A. D. Mayfield
Sanitary Engineer

ADM:ns

our copy

May 22, 1959.

Mr. Jack Smith, Executive Secretary,
Water Pollution Board,
Bureau of Public Health Engineering,
Missouri Division of Health,
Jefferson City, Missouri.

Dear Mr. Smith:

Copies of letters and reports concerning part of Industrial Waste Treatment facilities for Royal McBee are enclosed for your information.

Under separate cover, we are sending you marked copies of plans for these facilities, hoping that you and your engineers may find time to familiarize yourselves with this system before receiving slightly revised plans which I hope will be final.

A separate company proposes to install packaged treatment units for treatment of cyanide and chlorine wastes. All they have so far is a schematic layout with very limited discussion of the processes.

I will furnish correspondence and data on these packaged units when and if I receive it.

Your assistance in this matter has been greatly appreciated and, as you can tell, it will be needed in the future.

Very truly yours,

A. D. Mayfield,
Sanitary Engineer.

ADM:ns

GIFFELS AND ROSSETTI
ARCHITECTS • ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

April 28, 1959

Director of Public Works
City of Springfield
Springfield, Missouri

RE: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Port Chester, New York
Our Job No. 57-166

Attention: Mr. William E. Hedges

Gentlemen:

Enclosed are two prints each of Waste Treatment Facilities, Sheet 5, M-1, M-5, M-101, M-106, M-106, M-111, EL-105 and EL-106. This is the completed work.

This is a reply to your letter of April 22, 1959.

The system will be limited to the wastes as detailed in my letter of April 16, 1959. Therefore, this is the portion of the waste treatment facility which limits and controls the pH. The following items taken from your April 22, 1959 letter.

Plot Plan M-1

1. See Note #5. 10" existing line will be plugged.
2. The change in direction of the A-A line within 7'-0" of the new A.A.M.H. will permit easy maintenance.
3. The Baffles will be installed in the A-A M.H. to scour the electrode.
4. See description of operation on M-1.
5. The additional run of 6" PVC pipe from the neutralization tank to the new A.A.M.H. seems to be an unjustified expense. The neutralization operations will be performed by competent personnel who will make a complete test and will only release satisfactory wastes.

Industrial Waste Pump Pit

1. The single pump is one-half the cost of a dual setup. The small amount of use and maintenance downtime does not justify a dual setup.
2. The valves are Clayton hydraulically operated in response to instrumentation and sensing device.

GIFFELS AND ROSSETTI ARCHITECTS · ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
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Industrial Waste Pump Pit (Cont'd)

3. The pit is covered to keep out paper, etc. The system will handle acid, alkali and paint rinses. Therefore, the pit should not be a hazard. Portable vent system is possible.
4. The tanks will be coated with material specified on M-1.
5. The production will be shut down if repairs are necessary during periods of production. Actually, there will be no definite periods when the pH exceeds 9 or drops below 5.

Industrial Waste Neutralization Tank

The shear gate is cast iron with a removal seat. The exposure will be to a generally neutral liquid.

General

1. Single are being provided since it is anticipated that the system will function during emergencies, which will be seldom.
2. The self-neutralization feature of the system is provided in the neutralization tank with 10,000-gallon storage prior to release to sanitary sewer.

Letter of April 16th

1. N.C. = normally closed. Refer to description of operation on new print M-1.
2. Very good.
3. Royal McBee will furnish information.

When the approval is received, we will send the system to Mr. Jack K. Smith.

Yours very truly,
GIFFELS AND ROSSETTI

S. B. Chapoton

S. B. Chapoton

SBC:mk
Encls.
CC: Mr. W. E. Hedges (2)
Royal McBee Corp.
Mr. F. F. Behm (3)
Mr. L. R. Whitford
Mr. [illegible]

Mr. S. B. Chapoton
Mr. S. A. Littmann
Mr. C. R. Miller (2)
Mr. R. R. Miller
Mr. R. J. Stewart

Royal McBee Corporation
150 NEW PARK AVENUE • HARTFORD 6, CONN.

24 April, 1959

Mr. W.E. Hedges
Director of Public Works
City of Springfield
Springfield, Missouri

Dear Mr. Hedges:

Enclosed is a schematic diagram of the Chrome and Cyanide treating system for our Springfield plant, together with a brief description of the process.

This system is widely and successfully used for treatment of this type of waste.

Best regards,

ROYAL McBEE CORPORATION

F. F. Behm

F. F. Behm
Facilities Planning
Engineer

FFB/ed
Encl.

SEQUENCE OF OPERATION
FOR
WASTE DISPOSAL SYSTEM

The Waste Disposal System which we propose will be a continuous system for handling three separate wastes. See George L. Nankervis Company Drawing #10158, Waste Disposal System for Royal Typewriter Company.

~~Acids and Alkalis~~

~~The acids and alkalis will be received from the rinse tanks. The acids and alkalis will flow at a rate of approximately 800 GPH. The waste processing equipment will have a capacity of 800 GPH. The wastes from the rinse tanks will be manifolded and transmitted by gravity to Tank T-2, the Interceptor, having a volumetric capacity of 300 Gal. The waste will be pumped from the Interceptor by either one of the two pumps P-1 or P-2, each having a capacity of 20 GPM. These pumps will be arranged for alternate operation with provision for both pumps to be put in operation if the flow should exceed the capacity of one of the pumps. Pumps P-1 or P-2 will pump the waste to Tank T-3 where Sodium Hypochlorite will be injected at the rate of approximately three (3) gallons per pound of cyanide. The Sodium Hypochlorite will be added at a fixed rate, determined by adjustment. Tank T-3 will be a specially designed baffle tank which will hold the waste for a period of one hour to convert it to cyanate. The processed wastes will then be transmitted to the sewer. Provision will be made in Tank T-3 for removal of sludge. The cyanide content of the rinse waters will be held approximately constant by means of conductivity control B-1 at each rinse tank. When the contamination in a rinse tank exceeds a certain fixed amount, the conductivity control will energize a solenoid valve which will add water until the liquid in the rinse tank has been clarified.~~

Cyanide Wastes

The cyanide wastes will be processed by the George L. Nankervis Company Model 5769 Cyanizer. The wastes will be received from the rinse tanks. The cyanide wastes will flow at a rate of approximately 800 GPH. The waste processing equipment will have a capacity of 800 GPH.

The wastes from the rinse tanks will be manifolded and transmitted by gravity to Tank T-2, the Interceptor, having a volumetric capacity of 300 Gal. The waste will be pumped from the Interceptor by either one of the two pumps P-1 or P-2, each having a capacity of 20 GPM. These pumps will be arranged for alternate operation with provision for both pumps to be put in operation if the flow should exceed the capacity of one of the pumps.

Pumps P-1 or P-2 will pump the waste to Tank T-3 where Sodium Hypochlorite will be injected at the rate of approximately three (3) gallons per pound of cyanide. The Sodium Hypochlorite will be added at a fixed rate, determined by adjustment. Tank T-3 will be a specially designed baffle tank which will hold the waste for a period of one hour to convert it to cyanate. The processed wastes will then be transmitted to the sewer.

Provision will be made in Tank T-3 for removal of sludge. The cyanide content of the rinse waters will be held approximately constant by means of conductivity control B-1 at each rinse tank. When the contamination in a rinse tank exceeds a certain fixed amount, the conductivity control will energize a solenoid valve which will add water until the liquid in the rinse tank has been clarified.

Chrome Wastes

The chrome wastes will be processed by a George L. Nankervis Company Model #3340 Chromator. The chrome wastes will be received from the Chrome Rinse Tanks. This waste will flow by gravity at the rate of 600 GPH into the

Interceptor Tank T-7, which has a volumetric capacity of 300 gallons. The waste will be pumped from Tank T-7 to Tank T-8 by means of either pump P-3 or P-4. These pumps are arranged for alternate operations with provision for operating both pumps if the flow exceeds the capacity of either of the pumps.

In Tank T-8 Sulphuric Acid and Sodium Metabisulphite will be added in the first zone, from Tank T-4 and Tank T-5. These ingredients will be passed through a one-half hour retention zone in Tank T-8. Immediately after this Zone, 50% concentration Sodium Hydroxide will be added from Tank T-6, and at this point Mixer M-2 will flash-mix this combination to insure adequate mixing. The Sodium Hydroxide will be held with the wastes in the next Zone for a two-hour retention period, after which the waste will be passed to the sewer.

Sulphuric Acid, Sodium Metabisulphite and Sodium Hydroxide will be added at a fixed rate. Each rinse tank will be equipped with conductivity control B-2. These controllers will add water to the rinse tanks only when the contamination of the rinse tanks exceeds a fixed amount. Water will be added until the contamination level has been reduced to a set value.

April 22, 1959.

Mr. S. B. Chapoton,
Giffels and Rossetti,
Marquette Building,
Detroit 26, Michigan.

Dear Mr. Chapoton:

I am forwarding a copy of our Sanitary Engineer's review of your preliminary drawing showing the "Industrial Waste Treatment Facilities".

I am advised that the drawings are actually limited to the pH control system. Please note the requested changes in the plans. We will be happy to review the plans after such changes have been made.

If you have any questions, please feel free to ask them.

Very truly yours,

W. E. Hedges
Director of Public Works

ADM:ns
cc: Mr. F. F. Dohm
Mr. Jack Smith
Conseer, Townsend & Associates

April 22, 1959.

Mr. F. F. Behm,
Facilities Planning Engineer,
Royal McBee Corporation,
Hartford 6, Connecticut.

Dear Mr. Behm:

I am forwarding a copy of our Sanitary Engineer's review of your preliminary drawing showing the "Industrial Waste Treatment Facilities".

Your attention is specifically directed to the request for complete plans, specifications and basic design data for the separate package system for cyanide and chrome wastes.

Will appreciate receiving this information at a sufficiently early date to permit adequate review of this system.

Very truly yours,

W. E. Hedges
Director of Public Works

ADM:ns

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Mr. W. E. Hedges DATE April 22, 1959.

DEPARTMENT Public Works

Plans were received April 16th. and the letter was received April 20, 1959 for the "Industrial Waste Treatment Facilities" for the Royal McBee portable typewriter plant. The title is somewhat of a misnomer because the plans actually show only the pH control system.

The following questions and comments appear to be in order:

(Items followed by "A" require action or serve as notification)

Plot Plan

(1) Existing A-A sewer to manhole #32 would have to be adequately plugged. (A)

(2) Change of direction in A-A sewer without a manhole at E + 73 appears to be questionable from a maintenance standpoint.

(3) There appears to be danger of sludge accumulation around the electrode in the pH manhole which might short circuit the sensing element. How will this be handled? (A)

(4) I do not understand what the electrode actuates to divert excessive acid or alkaline flows. Request explanation. (A)

(5) Six inch VCP drain from neutralization tank will have to return to the double A line at or above the pH control manhole to prevent discharge of inadequately treated waste to the main sewer. (A)

Industrial Waste Pump Pit

(1) There appears to be only one pump. This means that there is no protection when the pump needs repairs. Request dual pumps. (A)

(2) Two peculiar looking fixtures are shown in the pump pit which I suspect are some type of electronically controlled valves. They are not identified. Request identification and explanation of operation. (A)

(3) The pump pit is approximately 14 feet deep with a working platform of grating approximately 9 feet from the ground surface. A slab top with access manhole is shown. Previous data indicates that cyanide and chlorinated hydrocarbons will be discharged through this system. It is, therefore, considered that the pump pit as shown would be a serious hazard to anyone entering the pump pit for inspection and maintenance. Positive means of ventilation should be provided. (A) The use of grating over the pit is suggested to facilitate visual inspection and ventilation.

(4) Specifications were not provided but it is apparent that both the pump pit and neutralization tank which will be subject to highly acid and highly alkaline liquids will need very careful protection of concrete and metals against corrosion. (A)

SIGNED

CITY OF SPRINGFIELD
INTER-OFFICE MEMORANDUM

ATTENTION OF Mr. W. E. Hedges DATE

DEPARTMENT Public Works - Page 2 of 2

(5) The writer does not understand how repairs can be made to the control devices without shutting down all finishing plant production. All parties concerned should realize that these devices will need repairs and maintenance; and, if it is necessary, production will have to be shut down in order that these repairs can be made promptly. (A)

Industrial Waste Neutralization Tank

There is some concern that a shear gate may not provide a tight closure after considerable exposure to corrosive conditions. The use of a plug valve of the chemical service type is suggested.

General

(1)

The writer feels obliged to comment on the lack of duplicate facilities, i. e., one electrode, one set of control valves, one pump and one mixer. It appears that it will be necessary that replacement units in operating condition be kept in stock at the plant to make certain that the system can be returned to full operation in a minimum amount of time. (A)

(2)

It appears to the writer that the general plan fails to take full advantage of the self-neutralization features of the flows. The City's concern in this matter is to reduce temptation to bypass or neglect this system.

Letter of April 16th.

(1) This letter refers to "one n.c. and n.o. automatic valve with a time delay". I do not understand this reference. Will appreciate clarification including definition of the abbreviation. (A)

(2) The data furnished on types and volume of alkaline and acid waste indicates that the pH control system can handle approximately one hour of flow starting with a low liquid level in the pump pit and an empty neutralization tank. Thus, there appears to be adequate capacity.

(3) The letter states that the cyanide and chrome wastes collection and treatment systems will be by a separate package purchased by the Lloyd McBee Corporation. We will, of course, need complete plans, specifications and basic design data for the separate package system. (A) We should receive this information early enough to permit thorough review without delaying installation. (A)

When the requested changes have been made in the plans for the pH control system, Giffels & Rossetti should provide two copies for our review and approval and two copies should be sent, with appropriate specifications, to Mr. Jack K. Smith, Executive Secretary, Water Pollution Board, Missouri Division of Health, Jefferson City, Missouri, for review. (A)

(A) Action required.

SIGNED

GIFFELS AND ROSSETTI
ARCHITECTS · ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD C. TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

April 16, 1959

Director of Public Works
City of Springfield
Springfield, Missouri

RE: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Port Chester, New York
Our Job No. 57-166

Attention: Mr. William E. Hedges

Gentlemen:

On April 13, 1959, we sent you two prints of Sheet M-1, showing the "Industrial Waste Treatment Facilities".

This is a preliminary drawing of the system to provide:-

1. Sensing device upstream of the collecting sump. Diversion from the sanitary sewer will take place when Ph exceeds 9 or falls below 5.
2. Pumps in collecting pit will discharge to the neutralization tank, 10,000-gallon capacity.
3. Testing, treating and mixing will be done in this tank until the Ph is acceptable. The liquid will then flow by gravity to sanitary sewer system.
4. Alarms will be provided.

The pump pit has one n.c. and n.c. automatic valve with a time delay so that all wastes not acceptable will be diverted for treatment. This is a refinement of the earlier system.

The finishing area drain system will collect the following:

	Alkali Waste g.p.m.	Acid Waste g.p.m.
Automatic Chrome and Nickel Machine	3 tanks @ 5 = 15	5 tanks @ 5 = 25
Zinc Plating Machine	4 tanks @ 5 = 20	6 tanks @ 5 = 30
Barrel Line	1 tank @ 5 = 5	7 tanks @ 5 = 35
Hand & Manual Plate Tanks	3 tanks @ 5 = 15	4 tanks @ 5 = 20
Painting	1 tank @ 20 = 20	2 tanks @20 = 40
	75	150
		TOTAL = 225

5-13-59

GIFFELS AND ROSSETTI

ARCHITECTS · ENGINEERS

MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

The cyanide and chrome wastes, collection and treatment systems will be by a separate package purchased by Royal McBee Corporation.

Yours very truly,

GIFFELS AND ROSSETTI

S. B. Chapoton

S. B. Chapoton

SBC:mk

CC: Royal McBee Corporation
Mr. F. F. Behm (3) (Encls-2 prints)

December 30, 1958

Giffels & Rossetti
Marquette Building
Detroit 26, Michigan

ATTENTION: Mr. S. B. Chapoton

RE: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Your Job No. 57-166

Gentlemen:

This acknowledges receipt of your letter of the 16th and the prints enclosed.

Mr. Mayfield is on vacation at the present time and has not had an opportunity to go over the prints in detail; however, I feel sure from your letter that he will be well pleased with your design.

Very truly yours,

W. E. Hedges
Director of Public Works

VWW:ocl

AIR MAIL

December 19, 1958

Mr. F. F. Behm
Facilities Planning Engineer
Royal McBee Corporation
Westchester Avenue
Port Chester, New York

Dear Fritz:

Our engineers tell me that the wording of my letter of December 18, 1958, might be a little ambiguous on the matter of weak waste, the normal or routine flows from the finishing departments.

The pH of these wastes must be monitored and controlled. This point was established and limits set by the letters listed below, by several conferences, and by our Sewer Use Ordinance.

On the basis of information you have furnished, adequate control of pH appears to be the only pre-treatment needed for the weak wastes. (See Mr. Hedges' letter to Mr. Chapoton dated October 9, 1958.)

Mr. Chapoton has submitted plans for an emergency holding tank system which would monitor and control the pH of the weak wastes. Mr. Hedges' letter to Mr. Chapoton dated December 11, 1958, stated general approval of the proposed system for monitoring and controlling the pH of wastes if plans were modified. Mr. Mayfield's letter to Mr. Chapoton dated December 11, 1958, discussed the desired modifications.

I am sending a copy of this letter to Mr. Chapoton. I trust that this letter is a clear expression of the City's ideas about weak wastes from the finishing departments; but if there are any questions on this matter, please feel free to rush them to us.

Sincerely,

W. B. Avery
City Manager

File

WBA:ocl

cc: Mr. S. B. Chapoton

1. Mr. Hedges' letter to Mr. Chapoton of Giffels & Rossetti dated December 11, 1958
2. Mr. Mayfield's letter to Mr. Behm dated October 9, 1958
3. Mr. Hedges' letter to Mr. Chapoton dated October 9, 1958
4. Mr. Hedges' letter to Mr. Chapoton dated September 15, 1958

file

December 18, 1958

Mr. S. B. Chapoton
Giffels & Rossetti
Marquette Building
Detroit 26, Michigan

Dear Mr. Chapoton:

The following references may be of interest to you:

Whalen, J. M., "Plating, Heat Treating and Painting Wastes", Sewage and Industrial Wastes, 30, 11, 1379 (November, 1958).

Operations and problems in treating plating, heat treating, and painting wastes at the Kingston, New York plant of International Business Machines Corporation.

This operation appears to be comparable to the proposed operation of the Royal McBee Typewriter Plant at Springfield, Missouri. Their flows appear to be higher but they do not have a municipal sewerage system to handle dilute rinses.

The discussion of treating a 250 gallon etching solution of chromic acid is indicative of strengths and quantities of concentrated chrome dumps (pp. 1381 and 1382). The 250 gallon solution appears to contain 325 pounds of chromium, apparently all in hexavalent form. This is 1.3 pounds of chromium per gallon.

Besselievre, E. B., "Pontiac Motors Treats Its Wastes", Wastes Engineering 29, 11, 642 (November, 1958).

Same, "Auto Wastes Pretreated for Discharge into City Sewers", Wastes Engineering, 29, 12, 690 (December, 1958).

Scale of operations is not at all comparable with Royal McBee, but the limits of concentrations as discharged to the City of Pontiac sewers and the detection and control devices are quite attractive. The redox controller was of particular interest to me.

Bernhardt, H. F., "Toxic Wastes Made Harmless - Automatically," Instrumentation, 11, 4, 20.

Yours truly,

A. D. Mayfield
Sanitary Engineer

ADM:ocl

December 18, 1958

Mr. F. F. Behm
Facilities Planning Engineer
Royal McBee Corporation
Westchester Avenue
Port Chester, New York

Dear Fritz:

Following our telephone conversation of today, I am enclosing a tabulation of maximum concentration of strong materials which has been worked out by our engineering staff.

I am sorry if our delay in getting this information to you has caused you inconvenience. We felt it would be better to develop these strong solutions as maximums, and I believe you are aware of the fact that your normal discharge from normal operations would give us no concern. It is the strong solutions on which we have to establish these maximums. The reason for this is that if we do not take these precautions, it will endanger the operation of our sewer plant and also the lives of the men who work in the manholes where the gases may concentrate.

The attached sheet will give you this information.

Sincerely,

W. B. Avery
City Manager

WBA/mg
Encl.
CC: A. D. Mayfield

GIFFELS AND ROSSETTI ARCHITECTS • ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

December 16, 1958

City of Springfield
Department of Public Works
Springfield, Missouri

RE: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Port Chester, New York
Our Job No. 57-166

Attention: Mr. William E. Hedges,
Director of Public Works

Gentlemen:

This is a summary of the action taken as a reply to your two letters of September 15, 1958.

Enclosed are two prints each of Drawings M-2, M-3, M-4, M-5, M-6, M-7, M-101, M-102, M-103, M-201, M-202 and M-308.

Sanitary Sewers:

A minimum drop of 0.10 foot has not been provided across each manhole where there is no line size change since the manholes have channel bottom. There will be no head loss at maximum flow.

The east extension of the sewer is contemplated to be 800 feet maximum. The invert at the end will be approximately 42.0 or 3'-0" below the floor with elevation of 45.00. The 0.40% for 8" vitrified clay pipe will provide a velocity of 2.1 ft/sec.

The pre-formed bituminous joints specified provide an excellent joint if installed in accordance with manufacturer's instructions. The PVC pre-molded joints are more expensive. The PVC joint was specified for the industrial waste from the finishing area under the building to the outside sanitary connection. However, the B and G Olsen Mechanical Contractors have installed all of the sanitary sewers using PVC joint pipe.

Manhole No. 27 is now Manhole No. 31. This manhole now has a drop from the north as detailed on M-6.

Manhole No. 28 is now Manhole No. 32. The incoming lines from the south now drop 1.1 feet (invert to invert) which is considered acceptable.

Inlet No. 35 is now Inlet No. 25. The 10" line discharges into Manhole No. 32 with a difference, invert to invert, of 3.0 feet which is not excessive.

GIFFELS AND ROSSETTI ARCHITECTS · ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

The Sewage Metering Pit dimensions have been changed to agree. The length of the rectangular channel has been increased to reduce turbulence. The fillets have been added to eliminate the sludge catching pockets. The angles are now aluminum.

The lighting and ventilation of this pit could be handled as adequately by portable means as by a permanent installation. The possibility of failure or interruption of the pit power source and the general use of portable facilities for inspection indicates that permanent facilities are not the best solution.

Drop Manholes with the bottom slab extended provides more adequate support for the drop portion, in the cases of deep excavations. However, excavation practices being followed in field with limestone encountered should not make this addition necessary.

Laboratory Drain will be the vitrified clay pipe with PVC joints. The drain has been relocated on M-101.

The Sanitary Sewer location at the north property line has been relocated to agree with city location.

Yours very truly,

GIFFELS AND ROSSETTI

S. B. Chapoton

SBC:mk
Encls.

CC: Mr. W. E. Hedges (2)
Mr. F. F. Behm (3)

December 18, 1958

Mr. S. B. Chapoton
Giffels and Rossetti
Marquette Building
Detroit 26, Michigan

Dear Sid:

I have just talked to Fritz Behm, and he tells me that you are being delayed on the design of the plant here because of a need for a statement from the City as to the concentrations that will be permitted in our sewer lines.

We would like to say first that it is the feeling of our engineers that the normal wastes would give us no trouble and require no special treatment, but they do believe that there would be a problem on strong wastes.

We have just studied a report on the Kingston, New York, IBM operation and believe that their strong materials discharge may be somewhat similar to yours. This tabulation is set forth in the attached schedule. We have attempted to spell these out in terms of maximum concentrations.

We will be glad to give you any more information you may desire.

Sincerely,

W. B. Avery
City Manager

Wl
Endg

Maximum concentrations of toxic materials have been worked up on these bases:

1. Not more than 200 cubic feet of wastes per minute from the finishing departments during a working day of eight hours.

2. The finishing departments' wastes will be about one-third of the total volume of sewage discharged from the plant during the eight hours.

To avoid slugs of concentrated heavy metals, the following are the maximum concentrations at any time which can be discharged into the Royal McBee sewer from the collection, retention, and pre-treatment system for the finishing departments:

Material	As discharged to sewer
Chromium only:	
Hexavalent chromium	10 ppm
Total chromium	30 ppm
Nickel only	100 ppm
Nickel and chromium combined	100 ppm including not more than 10 ppm of hexavalent chromium
Copper	10 ppm
Cadmium	18 ppm
Zinc	30 ppm
Sum of all heavy metals (excluding alkaline earth metals, iron and manganese)	144 ppm

If the finishing departments work more than one eight-hour shift per 24 hours or the volume of waste from the departments exceeds 120,000 gallons per 24 hours, the maximum concentrations will have to be reduced.

For protection of men working in manholes and the sewage plant, a maximum concentration of 10 parts per million of cyanide at any time is required for wastes discharged into the Royal McBee sewer.

We must be furnished information concerning the chemical reactions which will be used in treating wastes, the degree of treatment, the sequence of processing, the frequency of tratment of strong wastes, the quantities of strong wastes, the time required for the various treatment operations and the time available for treatment. These are basic design data that we have asked for. They are discussed with you because these data should be used by you in design of the system, just as we need them to check the adequacy of the proposed system.

file

December 11, 1958

Mr. F. F. Behm
Facilities Planning Engineer
Royal McBee Corporation
150 New Park Avenue
Hartford 6, Connecticut

Dear Sir:

Plans for an emergency holding tank system have been reviewed and a copy of our letter to Giffels and Rossetti is enclosed.

We must again ask you to furnish us the following information from your Hartford operations:

1. How big are the baths for plating, that is how many gallons of liquid?

2. How many baths are there of each size?

3. What kind of liquid is in each bath?

4. What is the strength or concentration of each bath, that is the amount of chemical present?

5. How often are these baths dumped?

6. Detailed comparisions of Hartford operations with those expected for the new plant here.

Until we have this information, we cannot discuss industrial waste treatment for the Springfield plant in more than generalities; and we cannot approve any plans or construction without it.

Yours truly,

W. E. Hedges

W. E. Hedges
Director of Public Works

ADM:ocl

ccs: Missouri Division of Health

Mr. S. B. Chapoton, Giffels & Rossetti

Conscer, Townsend & Associates

file

December 11, 1958

Mr. S. B. Chapoton
Giffels & Rossetti
Marquette Building
Detroit 26, Michigan

RE: Industrial Waste Treatment
Royal McBee Corporation
Springfield, Missouri

Dear Sir:

Three prints of Sheet XM-1 showing the emergency holding tank system for industrial wastes from the metal finishing operations were received December 8, 1958, and reviewed.

The system with minor modifications would satisfy the City of Springfield's requirements for pH control but does not appear to be a complete solution for the associated problem of handling concentrated toxic wastes. It may be that the conference attended by Mr. F. F. Behm of Royal McBee, Mr. S. B. Chapoton of Giffels and Rossetti and Mr. A. D. Mayfield, City Sanitary Engineer, did not explore the concentrated toxic waste problem in sufficient detail. It is possible that none of the parties fully understood the safe guards that would be needed to protect sewage treatment processes and the receiving stream from being poisoned by a slug or slugs of concentrated toxic waste.

You report that tanks for plating baths contain about two hundred gallons; but as Mr. Mayfield pointed out, if two hundred gallons of a solution containing as little as four ounces per gallon of cyanide or of heavy metals were dumped, fifty pounds of toxic wastes must be handled. If some careless or headstrong employee dumped such a container into the sanitary sewer without pretreatment, sewage treatment biological processes would be severely damaged and probably stopped entirely by the combination of toxic materials from routine operation and the slug of concentrated waste. A large part of the toxic slug would pass through the plant into the creek and poison that water. You can imagine the results: dead fish, sick and dying dairy cows and other livestock, headlines, law suits, etc.

It should be quite clear that a high degree of protection is necessary. The proposed system does not appear to provide adequate protection because:

1. There is no provision for detecting and diverting highly toxic wastes which have a pH higher than 5.0 and lower than 9.0.

2. There appear to be no provisions for separating lime residues and heavy metal sludges from liquid wastes after reduction and precipitation.

3. There appears to be no protection available during repairs or maintenance of electrical and mechanical devices.

During the conference, this question was asked about protection from toxic wastes: "How safe is safe?" It appears that the answers to that question are as follows:

1. The toxic waste collection and pretreatment system should be so designed that it would not be possible to discharge concentrated toxic wastes to the sanitary sewer by opening or closing valves or pushing a button.

2. The collection and pretreatment system should be constructed of suitable materials which will withstand the corrosive effects of the liquids and solids which will be handled. This should guard against leaks, frequent breakdown or failure of equipment, and excessive maintenance.

3. The detection, diversion and treatment facilities should be provided in duplicate, or with alternate arrangements which will insure continuous protection during repairs and maintenance. The system should also permit safe handling of emergencies involving liquid wastes without stopping plant production but with adequate protection of our sewage collection and treatment system.

4. Pretreatment facilities must be capable of handling all concentrated toxic wastes well within the time available for treatment.

5. Treatment processes and facilities must be able to convert concentrated toxic wastes to stable compounds of low toxicity.

6. Plans and specifications must be supported by detailed estimates of quantities and concentrations of toxic materials to be processed. These basic design data are required for reviewing the adequacy of the system and processes.

We have made several requests for analyses and volumes of the various baths now being used at the Hartford plant and information about the frequency of dumping these strong solutions. To date, we have not been provided with sufficiently precise information to be able to decide how much treatment will be required for strong wastes.

If there is any further explanation or information we can furnish, please advise. We will be happy to work with you in any way that we can to provide effective waste treatment for the Royal McBee plant.

Yours truly,

W. E. Hedges

W. E. Hedges
Director of Public Works

ADM:ocl

ccs: F. F. Behm, Royal McBee

Missouri Division of Health

Conner, Townsend & Associates

file
Regal Meter

December 11, 1958

Mr. S. B. Chapoton
Giffels & Rossetti
Marquette Building
Detroit 26, Michigan

Dear Mr. Chapoton:

Mr. Hedges' letters to you and Mr. Behm cover the general waste disposal difficulties and objectives. This letter covers comments and recommendations on the plans as submitted.

Collection, diversion, and pretreatment facilities for the typewriter plant are for the protection of our sewerage system. Thus it appears to me that the City of Springfield must be more concerned with design details of this system than would normally be the case.

1. I have had after thoughts about the pH controlled diversion from just a pipe. There is surprisingly little mixing in a pipe. Various liquids travel in sequence with changes due to additions at various points. Unless the electrode is preceded by a sizeable equalizing tank, probably with agitator, the valve will flop open and shut so frequently it will fail or more likely, the operators will rip the wires from the electrode in despair.

2. pH for oxidation of cyanides is about 2.5 and for reduction of hexavalent chromium is about 11.0 - 12.0. Unprotected concrete will disintegrate rapidly under these corrosive conditions. Where is the City's protection during repairs?

   a. No protection shown for pump pit, treatment tank, the sides of the weir. (Floor of weir shown as v.c. flat liner plates), or above elevation 1338.91 in open channel between electrode and valve.

   b. Concrete in overflow area will be wetted when pH of waste is in corrosive ranges.

3. The ten inch pipe can carry enough flow to flood the valve pit because the weir cross section is smaller than that of the pipe.

4. Is the valve pit drained to the pump pit?

5. Whenever cyanide waste is mixed with acid waste, hydrogen cyanide will be released. The covered pits could be a death trap for a main-

tenance man. The fear of such release could encourage neglect of the equipment.

6. Isn't the connection of the water line to the sewer a serious risk to the water supply? Isn't a back flow preventer required at a level above any possible flooding of valve pit by a sewer stoppage?

7. The pump motor could be flooded and probably ruined by a sewer stoppage. Wouldn't above ground location reduce corrosion and facilitate maintenance?

8. The point of discharge from the holding and treatment system must be up stream from the electrode to prevent untreated or inadequately treated waste from being pumped into the industrial waste sewer.

9. A large volume of untreated or inadequately treated waste could be drained back into the sewer from a full treatment tank by pump failure and leaky check valve or by deliberately shutting off the pump and opening the bottom valve in the treatment tank.

10. I don't understand the high location of the mixing paddles.

11. For manual introduction of chemicals, a separate opening with an easy opening cover and ample dimensions should be provided. It might replace the sampling hole. Use of the access manhole would be laborious and might be risky because frame, cover, and steps are certain to be fouled by the chemicals.

13. In our conference, we discussed a bypass with lead seal on the valve to permit repairs and maintenance of the detection, diversion, and treatment facilities. Plans show no by pass.

14. We have not received the revised plans showing sewers inside the building which provide segregation of domestic and industrial wastes. These building sewers are considered part of the industrial waste control system. Please furnish.

15. The plans do not show how lime residues and precipitated heavy metal sludges would be removed from the liquid wastes.

16. The more I study the situation and compare it with similar plating waste treatment facilities reported in recent technical literature, the less confidence I have in a system that permits any possibility of mixing strong cyanide wastes and hexavalent chromium wastes prior to treatment.

a. With common collection and retention sewers and tanks in addition to the hazard of release of hydrogen cyanide, there is the incompatability of treatment and potential reversal of reactions after treatment.

b. The use of a common treatment tank brings up the time element. Can the various dumps be allowed enough collecting, analyzing

and reaction time to process the dumps before routine operations are resumed? What could be done if the plant went to three shift seven days per week operation?

c. What happens if a cyanide bath must be dumped while an acid is being processed or vice versa? Segregation of strong chrome and cyanide wastes appears to be a better answer after each study of the problem.

17. How much storage will be provided for waste treatment chemicals?

WT We Must be informed!

18. ~~There is no~~ information concerning the chemical reactions which will be used in treating wastes, the degree of treatment, the sequence of processing, the frequency of treatment of strong wastes, the quantities of strong wastes, the time required for the various treatment operations and the time available for treatment and the methods of determining strengths and completion of treatment. These are basic design data that we have asked for. They are discussed with you because these data should be used by you in design of the system just as we need them to check the adequacy of the proposed system.

Do you know of anything more we can do to expedite the installation of adequate industrial waste treatment facilities at the new Royal McBee plant?

Very truly yours,

A. D. Mayfield
Sanitary Engineer

ADM:ocl

ccs: Missouri Division of Health (Enc. 1 print)

Conscer, Townsend & Associates (Enc. 1 print)

Dear Sir: December 15, 1958

We hereby acknowledge the receipt of: Plans for Industrial waste treatment facilities, for portable typewriter plant, Springfield, Missouri.

Our review will be completed and reported to you in the near future.

Very truly yours,

John H. McCutchen

John H. McCutchen, Director
Bureau of Public Health Engineering
Missouri Division of Health

JSCH

2084

CITY OF SPRINGFIELD

DEPARTMENT OF PUBLIC WORKS

SPRINGFIELD MISSOURI

October 9, 1958

Giffels and Rossetti
Marquette Building
Detroit 26, Michigan

VIA AIR MAIL

ATTENTION: Mr. S. B. Chapoton

RE: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Your Job No. 57-166

Gentlemen:

This letter will confirm discussion Mr. Chapoton had on October 7, 1958, with Mr. A. D. Mayfield, City Sanitary Engineer, concerning industrial wastes from the new plant.

We have received and studied the analysis of a composite sample of industrial waste from Royal McBee's Hartford Plant. The analysis represented a single work day in the middle of a week, and it was not clear whether samples were taken in proportion to flow. Thus questions concerning wastes from dumping of tanks and clean up activities are still not answered.

The report of analysis received from Royal McBee does not change any of the requirements outlined in our letter to your company dated September 15, 1958, but does appear to limit the extent of pre-treatment of industrial wastes which will be necessary. Satisfactory pH control will be required. If the reported volume and strength of finishing wastes are representative of wastes which will be discharged from the Springfield plant, after pH adjustment, the weak wastes from routine metal finishing operations can be discharged to the sanitary sewer without further treatment. Thus the analysis plus descriptions of operations and strong waste volumes indicate that pH control will be the only continuous treatment necessary, provided positive control of the discharge of strong wastes can be assured.

To protect the City sewerage system and sewage treatment processes from slugs of concentrated toxic wastes, such positive control of the discharge of strong wastes from tank dumping and clean up will be necessary. Whether carefully controlled discharge or "bleeding off" of strong wastes from holding tanks to the sanitary sewer over a period of days will be sufficient protection will depend on volumes and strengths of such wastes.

We are writing Mr. F. F. Behm of Royal McBee direct to see if that company can furnish information on strong wastes, and thus allow us to give your company more definite answers concerning waste disposal facilities.

Very truly yours,

W. E. Hedges
Director of Public Works

ADM:ocl

ccs: Royal McBee, Hartford, Conn.
Consoer, Townsend & Associates
State Health Department

CITY OF SPRINGFIELD

SPRINGFIELD MISSOURI

October 9, 1958

Mr. F. F. Behm
Facilities Planning Engineer
Royal McBee Corporation
150 New Park Avenue
Hartford 6, Connecticut

Dear Sir:

We have received and studied your letter of September 10, 1958, concerning industrial wastes to be expected from your Springfield plant. The information was most welcome because it was the first indication of the probable concentrations and quantities of weak industrial wastes from routine finishing operations.

You will understand that we will need more information than can be brought out by the analysis of a single sample representing one work day in the middle of a week. Concerning that sample, how representative was the composite sample? Was the sample composited in proportion to the flow? Were clean up periods represented?

Strong wastes are of equal concern. The attached copy of a letter to Giffels & Rossetti, dated July 21, 1958, requested information on quantities and concentrations to be expected from clean up and from dumping strong solutions. It also requested information concerning toxic materials used in heat treating. The information that has been furnished is inadequate to support conclusions on our part.

We are enclosing a check list to assist you in providing the requested information. Pertinent items are checked in red pencil and should be completed if the information is available.

We are also enclosing two copies of the Sewer Use Ordinance for your guidance.

It is our earnest desire to work with your company and its consultants to develop the minimum facilities Royal McBee will need to dispose of its industrial wastes without damaging the City sewerage system and sewage treatment processes.

Your assistance in this matter will be appreciated.

Very truly yours,

A. D. Mayfield
Sanitary Engineer

Approved: W. E. Hedges
Director of Public Works

ADM:ocl

encs.

ccs: Giffels & Rossetti
Consoer, Townsend & Associates
State Health Department

September 15, 1958

Mr. S. B. Chapoton
Giffels and Rossetti
Marquette Building
Detroit 26, Michigan

Dear Mr. Chapoton:

This letter will list comments and suggestions by our Sanitary Engineer, A. D. Mayfield, concerning plans for the Royal McBee typewriter plant. Most of these were brought up during your recent visit to the Public Works Department. City requirements were set forth as far as possible in a separate letter.

Sanitary sewers:
It is suggested that a minimum drop of 0.10 foot be provided across each manhole.

A grade of 0.40% for 8" VCP appears to be a little flat for industrial sewers. A minimum grade of 0.50% is suggested.

East part of sanitary sewer system appeared to be too shallow for much extension.

We have heard of difficulties with pre-formed bituminous joints. Suggest polyvinylchloride pre-molded type joints or equal be used to junction with city sewer.

Manhole No. 27. Suggest drop connection for sewer from the north.

Manhole No. 28. Suggest grade of 10" sewer from south be increased to provide less turbulent discharge into this manhole. Also suggest connection from Inlet No. 35 be shifted to a new drop manhole about fifteen feet west of Inlet No. 35.

Sewage Metering Pit:
Discrepancies in elevations and dimensions seen on sheets M-6 and M-5 are reported to have been corrected.

Tumbling Solids Interceptor:
Suggest second manhole or access hole over long axis of pit and just clearing baffle on discharge side.

Water Treatment Equipment:
Back wash from zeolite type softeners will flow to Galloway Creek above fish hatchery. Creek is known to be connected to springs serving hatchery but the brines from backwash should not be strong enough to bother hatchery operations.

Sewer District for Royal McBee:
Last manhole should be built by Royal McBee as a district sewer. Royal McBee should request a sewer district. Some south and east portions of the Royal McBee property should be excluded from this first district and should later be included in a district served by a sewer in Sunshine.

Plant Laboratory:
You stated that a laboratory for process control would be built by Royal McBee and that a drain was provided in the building plans.

We appreciate the cooperation you have given us during the design and review of plans for the typewriter plant.

Very truly yours,

W. E. Hedges
Director of Public Works

ADM:ocl

September 15, 1958

Giffels and Rossetti
Marquette Building
Detroit 26, Michigan

RE: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Your Job No. 57-166

ATTENTION: Mr. S. B. Chapoton

Gentlemen:

This letter will confirm discussions between Mr. Chapoton and members of our Public Works Department concerning plans for the Portable Typewriter Plant, owner Royal McBee Corporation.

Our consulting engineers have written, "We do not believe that dumping into the sewer should be permitted except through a ceramic or brick lined leaching tank, in order to prevent the effluent entering the city sewer from having a pH lower than 5 at any time." Acidity control will be required and it is therefore recommended that:

a. Drains be changed to separate metal finishing wastes from other wastes.

b. Suitable tanks be provided to permit mixing, analysing and treating metal finishing wastes and controlling discharge to the sanitary sewer. Drains from metal finishing operations should discharge only into these tanks.

Decisions whether more segregation, treatment and control will be needed or not must be deferred until we have been furnished the information requested in our letters of July 21st and August 15th, 1958.

We have been informed that Inlet No. 35 (E18+54) serves a paved storage yard which cannot be satisfactorily drained to the storm sewer. It was also reported that oily metal turnings would be stored in this yard. It is felt that a sand and oil trap will be needed upstream from the sanitary sewer. It is suggested that Inlet No. 35 be changed to a grated interceptor of the type used for vehicle wash racks or that a separate oil and sand interceptor be provided.

Sewage Metering Pit

Please review design of open channels and flume. The length of the rectangular channel appears to be too short to permit turbulence from the change from pipe to channel to be damped out and flow stabilized ahead of

the Parshall flume. Tapered fillets in bottom corners are suggested to form transition sections from pipe to channel and from channel to pipe. These fillets will also eliminate sludge catching pockets.

A duct and suction fan with above ground controls or other means of positive ventilation will be required for the metering pit.

A safe and adequate means of lighting will also be required.

Angles shown at critical points on the bottom of the Parshall flume should be of corrosion resistant material.

Drop Manholes

It is recommended that the bottom slab of drop manholes be extended at least six inches beyond the encasement of pipes to increase support of the drop system.

It is recommended that the type of material and jointing proposed for the plant laboratory drain be reviewed and the drain identified on the plans. Chemical laboratory wastes are frequently highly corrosive.

General Ordinance No. 1035, the Sewer Use Ordinance, requires that plans for industrial waste treatment facilities be approved by the State Department of Health as well as by the City of Springfield. It is recommended that you furnish the bases for design when you send plans for collection and treatment facilities to us and to the State.

Very truly yours,

W. E. Hedges
Director of Public Works

ccs: Consoer, Townsend
State Dept. of Health

ADM:ocl

Royal McBee Corporation

150 NEW PARK AVENUE · HARTFORD 6, CONN.

SEPTEMBER 10, 1958

MR. V. B. AVERY
CITY MANAGER
CITY HALL
SPRINGFIELD, MISSOURI

DEAR SIR:

SID CHAPOTON HAS INFORMED ME OF YOUR REQUEST FOR MORE SPECIFIC INFORMATION ABOUT THE TOXIC AND CORROSIVE WASTES TO BE EXPECTED FROM OUR SPRINGFIELD PLANT.

SINCE IT IS VERY DIFFICULT TO PREDICT EXACTLY WHAT OUR EFFLUENT WILL BE AT THE NEW PLANT, I HAVE HAD ANALYZED SAMPLES OF OUR WASTES AT THE HARTFORD PLANT. THESE SAMPLES ARE ONLY OF THE EFFLUENT FROM OUR FINISHING DEPARTMENTS AND DO NOT INCLUDE SANITARY WASTES OR OTHER WATER FOR COOLING, WASHING, ETC. THAT WOULD EFFECT CONSIDERABLE DILUTION.

THE EFFLUENT FROM THE FINISHING DEPARTMENTS, FROM WHICH THE SAMPLES WERE TAKEN, REPRESENTS ABOUT ONE THIRD OF THE TOTAL PLANT EFFLUENT. SINCE THE REMAINDER OF THE EFFLUENT IS NOT CONTAMINATED BY ACIDS OR ALKILIS, DILUTION WOULD BE EFFECTED BY THE RATIO OF TOTAL EFFLUENT TO THE CONTAMINATED FINISHING DEPARTMENT WASTES.

THE STRUCTURE OF OUR DISPOSAL NETWORK IS SUCH THAT WASTES FROM VARIOUS PARTS OF THE PLANT ARE TAKEN SEPARATELY TO THE CITY SANITARY SEWER SYSTEM. THIS MADE IT DIFFICULT TO MAKE AN ANALYSIS OF THE COMPOSITE EFFLUENT.

THE TOTAL EFFLUENT AT A PEAK PERIOD IN THE HARTFORD PLANT IS APPROXIMATELY 100 CUBIC FEET PER MINUTE. IN SPRINGFIELD IT WILL BE CONSIDERABLY LESS THAN THIS. ALSO, BECAUSE OF THE DIFFERENCE IN PRODUCTS, THE DEGREE OF CONTAMINATION IN SPRINGFIELD WILL BE [illegible]

Will be some approval Springfield

RECEIVED SEP 15 1958 CITY MANAGER

ENCLOSED IS A COPY OF THE ANALYSIS MADE OF THE FINISHING DEPARTMENT SAMPLES. PLEASE BEAR IN MIND THE FACT THAT THIS IS UNDILUTED BY OUR OTHER WASTES, THAT IT IS THE SAMPLE FROM THE CONTAMINATED AREA ONLY. EVEN THIS IS WITHIN THE LIMITS SET BY THE METROPOLITAN DISTRICT WHICH CONTROLS THE LOCAL SEWAGE SYSTEM.

PLEASE CALL UPON US IF FURTHER INFORMATION IS REQUIRED.

VERY TRULY YOURS,
ROYAL McBEE CORPORATION

F. F. Behm

F. F. BEHM
FACILITIES PLANNING
ENGINEER

FFB/ED

ENCL.

C O P Y

COPY OF ANALYSIS

THE HENRY SOUTHER ENGINEERING COMPANY
11 LAUREL STREET
HARTFORD, CONN.

SEPTEMBER 5, 1958

ROYAL McBEE CORP.
HARTFORD, CONN.

GENTLEMEN:

WE HAVE THE FOLLOWING TO REPORT ON THE SAMPLE SUBMITTED TO THIS LABORATORY ON AUGUST 27, 1958.

SAMPLE NUMBER: 504123

MARKS: WASTE WATER SAMPLE - COMPOSITE OF BOTTLES MARKED AS FOLLOWS: BLDG. 10 - 9 AM, 10:30 AM, 11:30 AM, 1:00 PM, 2:05 PM, AND 3:05 PM - BLDG. 147 - 8:30 AM, 9:30 AM, 11:00 AM, 1:00 PM, 2:00 PM, AND 3:00 PM - COLLECTED AUGUST 27, 1958.

pH	9.0		
ALKALINITY	44.0 PPM		
COPPER	2.60 "	x 0.998	= 2.60 #/day
NICKEL	8.29 "	x 0.998	= 8.27 #/day
CHROMIUM	0.28 "	x 0.998	= 0.28 #/day
ZINC	3.05 "	x 0.998	= 3.04 #/day
CYANIDE (CN)	1.17 "	x 0.998	= 1.17 #/day

VERY TRULY YOURS,

THE HENRY SOUTHER ENGINEERING CO.

CONSOER, TOWNSEND AND ASSOCIATES • CONSULTING ENGINEERS
360 EAST GRAND AVENUE • CHICAGO 11, ILLINOIS • TELEPHONE SUPERIOR 7-7054

August 28, 1958

Mr. A. D. Mayfield
Sanitary Engineer
City of Springfield
City Hall
Springfield, Missouri

Dear Mr. Mayfield:

This is in reply to your August 15 letter relative to the preliminary analysis of industrial wastes to be anticipated from the Royal McBee plant to be located in Springfield.

I do not believe that the information given you by Giffels and Rossetti in their July 15 letter is of any value in determining the quantities of waste. However, the information which they submitted in their letter does not agree in any way with the information which you indicate in your preliminary analysis.

We have discussed this problem at some length in our office and believe that you should contact directly the Engineering Department at Royal McBee to determine exactly what their processes are, how much material they use daily, and what they anticipate from these processes will be passed on to the sewer on a chronological basis during an entire month. I cannot conceive of the quantities being allowed to pass to waste which you indicate in your analysis.

We also believe that you should send to the Royal McBee engineers a copy of your Sewer-Use Ordinance indicating what quantities of the various types of waste are permissible in the sewers. We do not think that any official allowance whatever should be made for any toxics which are prohibited from the sewers. If some allowance is made for toxic waste it should be strictly on a permissive basis, without official sanction, so that at any time the City could take the necessary steps to cause compliance with the strict letter of the Ordinance. As we see it, the word "permissible" should be only in your mind as that amount of toxicity which can be tolerated at the sewage plant.

In regard to your preliminary analysis, the quantities indicated as possible discharge from Royal McBee are more than ten times the total combined quantity discharged from Studebaker Corporation, Bendix Aviation Corporation and Oliver Tractor Company in South Bend, Indiana, all of whom have large

plating operations. We, therefore, believe that the information from which you have compiled this analysis is not accurate and again suggest you contact the Royal McBee engineers directly.

Yours very truly,

CONSOER, TOWNSEND & ASSOCIATES

JBM:eh

James B. Monahan

cc: Mr. W. E. Hedges
Director of Public Works
City of Springfield
Springfield, Mo.

Allen - also attached is one of our standard forms which we use for complete industrial waste analysis. It may be helpful to you

Jim

GIFFELS AND ROSSETTI
ARCHITECTS • ENGINEERS
MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

File Royal McBee India, Waste

August 21, 1958

W. B. Avery, City Manager
City Hall
Springfield, Missouri

Re: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Port Chester, New York
Our Job No. 57-166

Dear Sir:

Mr. F. F. Behm of Royal McBee has been informed regarding the information required as outlined in the July 21, 1958 and August 15, 1958 letters.

The requested information is difficult to obtain since the manufacturing and process layout has not been firmed up.

Mr. F. F. Behm indicated on August 19, 1958 that they would soon have the required information.

Yours very truly,

GIFFELS AND ROSSETTI

S. B. Chapoton

S. B. Chapoton

SBC:jt

cc: F. F. Behm (3)
W. E. Hedges
S. B. Chapoton
C. R. Miller (2)
R. J. Stewart

RECEIVED
AUG 25 1958
PUBLIC WORKS

August 15, 1958

Giffels and Rossetti
Architects-Engineers
Marquette Building
Detroit 26, Michigan

RE: Metal Finishing Wastes
Portable Typewriter Plant
Royal McBee Corporation
Springfield, Missouri
Your Job No. 57-166

ATTENTION: Mr. S. D. Chapoton

Gentlemen:

We realize that you are in the last stages of preparing to accept bids for the construction of the buildings for the portable typewriter plant of the Royal McBee Corporation. However, I have been informed we have not received an answer from you to our request of July 21, 1958, for more specific information about the toxic and corrosive wastes which may be expected from the proposed plant.

This information is needed as the basis for reviewing plans and reaching decisions whether pre-treatment facilities will be needed.

Your assistance in this matter will be appreciated.

Very truly yours,

W. B. Avery

W. B. Avery
City Manager

WBA:ocl

ccs: Division of Health
Consoer, Townsend & Associates

CITY OF SPRINGFIELD

OFFICE OF THE CITY MANAGER

SPRINGFIELD MISSOURI

August 15, 1958

Giffels and Rossetti
Architects-Engineers
Marquette Building
Detroit 26, Michigan

ATTENTION: Mr. S. B. Chapoton

RE: Metal Finishing Wastes
Portable Typewriter Plant
Royal McBee Corporation
Springfield, Missouri
Your Job No. 57-166

Gentlemen:

We have not received an answer from you to our request of July 21, 1958, for more specific information about the toxic and corrosive wastes which may be expected from the proposed Royal McBee typewriter plant. With the date so near for accepting bids for construction, we feel obliged to comment on this matter without waiting further for detailed information.

The attached report sets forth the comments and recommendations of our consulting engineers and our Sanitary Engineer. Holding tanks and treatment facilities would probably be built at some distance from the operations and assembly building. Thus it appears that the recommended changes can be made without delaying the construction of the main plant buildings.

Please note that the Sewer Use Ordinance requires that plans for industrial waste treatment facilities must be approved by the State Department of Health as well as the City of Springfield. It is recommended that you furnish complete bases for design when you send plans for the collection and treatment facilities to us and to the State Division of Health. That address is:

Jack K. Smith
Executive Secretary
Water Pollution Board
State Office Building
Jefferson City, Missouri

We will be happy to review the plans and to meet with the State engineers if you feel such a meeting would help.

Very truly yours,

W. B. Avery
City Manager

cc: Division of Health
Consoer, Townsend

WBA:ocl

August 15, 1958

Consoer, Townsend & Associates
Consulting Engineers
360 East Grand Avenue
Chicago 11, Illinois

ATTENTION: Leo F. Rehm
James B. Monahan

Gentlemen:

A copy of preliminary analysis of industrial wastes disposal for the proposed Royal McBee Typewriter Plant here in Springfield is enclosed with a copy of the letter from the architects listing toxic and corrosive materials.

Please note that the actual plans show an automatic zinc plating machine, although this material is not listed in their letter.

I must also report that the only laboratory seen in the plans is in the boiler house and appeared to be for control of water treatment.

Your comments and recommendations concerning the correspondence and the problem in general will be appreciated.

At this stage of developments, please be sure that any contacts or correspondence be with the City of Springfield and not with the architects or Royal McBee Corporation.

Very truly yours,

W. E. Hedges
Director of Public Works

By _____
A. D. Mayfield
Sanitary Engineer

ADM:ccl

enc.

R E P O R T

O N

METAL FINISHING WASTES

from

ROYAL McBEE TYPEWRITER PLANT

We have not received an answer from the architects to our request of July 21, 1958 for more specific information about the concentrations and quantities of toxic and corrosive wastes which may be expected from the proposed Royal McBee Typewriter Plant. With the date so near for accepting bids for construction, we feel obliged to comment on this matter without waiting for detailed information that would permit closer analysis of the situation.

Our consulting engineers, Consoer, Townsend and Associates of Chicago have written, "We do not believe that dumping into the sewer should be permitted except through a ceramic or brick-lined leaching tank in order to prevent the effluent entering the city sewer from having a pH lower than 5 at any time."

General Ordinance No. 1035, The Sewer Use Ordinance give 9.0 as the highest acceptable pH figure. Copies of this Ordinance were given to Royal McBee officials and to Mr. Chapoton during their first conference with us.

It appears that there will be acids in the sewer system capable of releasing hydrogen cyanide if significant concentrations of cyanide bearing wastes are discharged from the Royal McBee operations. A maximum of 10 parts per million of cyanide in wastes discharged to the typewriter plant sewer at any time is proposed to protect men working in manholes and the sewage treatment plant.

To protect sewage treatment processes from slugs of toxic wastes, the following maximum concentrations in wastes discharged to the typewriter plant sewer at any time are proposed:

Nickel and chromium combined	166 parts per million including not more than 20 parts per million of hexavalent chromium
Zinc	100 parts per million

These limits are tentative and may be changed when the daily total weight of each heavy metal reaching the sewage plant can be estimated.

In order to meet these limits and to make provisions for expansion of metal finishing operations it is therefore recommended that:

a. Drains be changed to separate metal finishing wastes from other wastes and sewage.

b. Separate drains be provided for weak solutions and for solution dumping.

c. Further separation be provided into acid-chromium wastes and alkaline-cyanide wastes.

d. Suitable tanks be provided to permit mixing, analyzing and controlling discharge to the sanitary sewer. Drains from metal finishing operations should discharge only into these tanks.

e. To prevent damage from spills or mistakes, tanks should not have gravity drains to the sewer but should be designed to be emptied or decanted by pumps of very limited capacity.

f. Treatment facilities be provided for strong wastes.

g. Provisions should be made for future expansion of these waste handling facilities.

The Sewer Use Ordinance requires that plans for industrial waste treatment facilities must be approved by the State Department of Health as well as the City of Springfield. It is recommended that the architects furnish complete bases for design when they send plans for the collection and treatment facilities to us and to the State Division of Health.

We will be happy to review the plans and to meet with the State engineers if such a meeting would help.

Respectfully submitted,

A. D. Mayfield
Sanitary Engineer

PRELIMINARY ANALYSIS

of

INDUSTRIAL WASTE DISPOSAL

ROYAL McBEE TYPEWRITER PLANT

Average flow in 1958-1959 to old sewage treatment plant = 8,000,000 gals.

8,000,000 gal. x 8.33 lbs/gal = 66,640,000 lbs. of sewage per day

1 part per million is equivalent to 1 pound per million pounds

Therefore 66.64 lbs. of material reaching sewage plant per day would be equivalent to 1 part per million if received in proportion to sewage flows.

There are other plating plants in Springfield. Therefore Royal McBee can only be allowed a proportion of the permissible quantities of cyanide and heavy metals reaching the sewage plant.

Toxic Material	Total Pounds per Twenty-four Hours	Pounds from Royal McBee
Cyanide	67	60
Chromium only hexavalent	67	60
Total Cr	330	300
Nickel only	330	300
Combined weight of chromium and Nickel	550 including not more than 67 lbs. of hexavalent chromium	500 including not more than 60 lbs. of hexavalent chromium
Copper *	67	60
Cadmium *	198	180
Zinc only	330	300
Sum of all heavy metals (Excluding alkaline earth metals but including iron and manganese)	1980	1800

*Not listed or found on plans

A large part of the Royal McBee wastes will reach the old plant at the end of the daytime flow from the rest of the city. A two to one dilution of Royal McBee sewage is probable at the sewage plant and a three to one dilution at the Royal McBee plant.

To avoid slugs of concentrated heavy metals it appears that concentration limits of materials discharged to the plant sewer will have to be set as follows:

	As Discharged to Sewer
Chromium only:	
Hexavalent chromium	20 ppm
Total chromium	100 ppm
Nickel only	100 ppm
Nickel and chromium combined	166 ppm including not more than 20 ppm of hexavalent chromium
Copper	20 ppm
Cadmium	60 ppm
Zinc	100 ppm

For protection of men working in manholes and the sewage plant, a maximum concentration of 10 ppm of cyanide at any time for wastes discharged into Royal McBee sewer is proposed.

pH limits 5.0 to 9.0 are proposed.

In order to meet these limits and to make provisions for expansion of metal finishing operations it is therefore recommended that:

a. Drains be changed to separate metal finishing wastes from other wastes and sewage.

b. Separate drains be provided for weak solutions and for solution dumping.

c. Further separation be provided into acid-chromium wastes and alkaline-cyanide wastes.

d. Suitable tanks be provided to permit mixing, analyzing and controlling discharge to the sanitary sewer. Drains from metal finishing operations should discharge only into these tanks.

Recommendations continued:

e. To prevent damage from spills or mistakes, tanks should not have gravity drains to the sewer but should be designed to be emptied or decanted by pumps of very limited capacity.

f. Treatment facilities be provided for strong wastes.

g. Provisions should be made for future expansion of these waste handling facilities.

Prepared by:

A. D. Mayfield
Sanitary Engineer

CONSOER, TOWNSEND AND ASSOCIATES · CONSULTING ENGINEERS

360 EAST GRAND AVENUE · CHICAGO 11, ILLINOIS · TELEPHONE SUPERIOR 7-7054

August 1, 1958

Mr. W. E. Hedges
Director of Public Works
City of Springfield
Springfield, Missouri

Dear Mr. Hedges:

This is in reply to your letter of July 18th regarding the effluent to be anticipated from the Royal-McBee Plant. We discussed this briefly by telephone the other day, but for the record I am writing you and suggest that the information as follows be passed on to Royal-McBee.

In their letter of July 15th they refer to dumping acid or cleaner tanks. We do not believe that dumping into the sewer should be permitted except through a ceramic or brick lined leaching tank, ~~which would~~ which would prevent the effluent entering the city sewer from having a pH lower than 5 at any time. A pH of 4 is corrosive to concrete pipe and we, therefore, recommend 5 as the minimum acidity limit.

Tile pipe will be installed from the Royal-McBee plant to the main trunk line at Barnes and Bennett, and some dilution would be available from the residences within approximately the two block run of pipe from the Royal-McBee plant.

With the above minimum acidity requirements we do not believe that any special jointing material need be used in this line or any special consideration be given to concrete line from Barnes and Bennett west.

Very truly yours,

CONSOER, TOWNSEND & ASSOCIATES

James B. Monahan

JBM:AF

GIFFELS AND ROSSETTI

ARCHITECTS · ENGINEERS

MARQUETTE BUILDING DETROIT 26, MICHIGAN WOodward 1-2084

RAYMOND F. GIFFELS P.E.
LOUIS ROSSETTI F.A.I.A.
EDWARD X TUTTLE A.I.A. CARL A. GIFFELS P.E. ROY I. JONES P.E. BERTRAM GIFFELS P.E. WILLIAM D. RAUSCH

July 25, 1958

File Indust. Work R-M

Mr. William E. Hedges
Director of Public Works
and City Engineer
City Hall
Springfield, Missouri

Re: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Port Chester, New York
Our Job No. 57-166

Dear Mr. Hedges:

Two (2) sets of General Contract Specifications dated July 17, 1958 and two (2) sets of the following Drawings have been sent to you. The Drawings are marked "Issued for Compliance With Building Code" with date of 7-24-58.

ARCHITECTURAL: Sheets #1 through 12, 101 through 116, 201 through 216 and 300 through 307

STRUCTURAL: Sheets E-101 through E-108, E-201, E-202, E-301, E-302, C-101 through C-105, C-201 through C-205 and C-301 through C-303

MECHANICAL: Sheets M-2 through M-7, M-101 through M-103, M-106 through M-112, M-114, M-115, M-201 M-202, M-205 through M-209 and M-301 through M-309

ELECTRICAL: EL-1, EL-101 through EL-109, EL-201 through EL-206 and EL-301 through EL-303

The above Drawings and Specifications will provide the information necessary for your check for compliance with the Building Code of the City of Springfield and for preliminary use for your inspectors.

The maximum first shift population of the Manufacturing and Assembly building for the present will be 734 males and 1,101 females. Facilities have been provided for an increase in population above this population.

RECEIVED JUL 28 1958 PUBLIC WORKS

GIFFELS AND ROSSETTI

July 25, 1958

Mr. William E. Hedges Re: Portable Typewriter Plant
Our Job No. 57-166

The Administration and Office area will have 90 males and 60 female employees. The Cafeteria will seat approximately 450 people.

Please contact me for any additional information required.

Yours very truly,

GIFFELS AND ROSSETTI

S. B. Chapoton

S. B. Chapoton

SBC:jt
cc: F. F. Behm (3)
S. B. Chapoton
C. R. Miller (2)
R. Stewart

file

July 21, 1958

Giffels and Rossetti
Architects - Engineers
Marquette Building
Detroit 26, Michigan

Re: Portable Typewriter Plant
Springfield, Missouri
Royal McBee Corporation
Port Chester, New York
Your Job No. 57-166

ATTENTION: Mr. S. B. Chapoton

Gentlemen:

This will acknowledge receipt of your letter of July 15, 1958, reporting anticipated effluent from finishing departments.

We appreciate the information. However, the descriptive word "dilute" is not specific enough to support any conclusions on our part concerning the effect of these wastes on sewers, sewage treatment processes, and employees working in manholes or in the sewage treatment plant.

It was also noted that nothing was stated about the disposal of spent or contaminated solutions.

A third item of possible concern is the disposal of solid wastes from heat treating which contain cyanide salts.

Please advise:

1. Quantity and concentration of each of various rinses anticipated, preferably on a per shift basis.

2. Quantities and concentrations of the various cleaning, etching, and plating solutions and the proposed disposal of spent or contaminated solutions.

3. Whether any toxic materials will be used in heat treating; and if so, the proposed disposal of toxic solid wastes.

Very truly yours,

A. D. Mayfield
Sanitary Engineer

Approved: W. E. Hedges
Director of Public Works

ADM:ocl

ccs: State Health Dept.
Consoer, Townsend & Associates

July 21, 1958

Bureau of Public Health Engineering
Division of Health
Jefferson City, Missouri

Gentlemen:

The attached letter is the first definite information which the City of Springfield has received concerning industrial wastes from the proposed typewriter plant, the Royal-McBee Corporation.

We will request more specific information concerning the concentration and the disposition of spent cyanide and other toxic solutions.

Very truly yours,

A. D. Mayfield
Sanitary Engineer

Approved: W. E. Hedges
Director of Public Works

ADM:ocl

enc.

file

April 22, 1958

Consoer, Townsend & Associates
Consulting Engineers
360 East Grand Avenue
Chicago 11, Illinois

Gentlemen:

A preliminary plan from Royal McBee indicates that their eighteen-inch sanitary sewer will discharge at a point approximately 2050 feet west of the Frisco tracks, and 1285 feet north of the north line of Sunshine.

Preliminary plan also shows the discharge elevation of about 1328 feet; however I believe we should keep out sewer somewhat lower than this to be on the safe side.

Very truly yours,

W. E. Hedges
Director of Public Works

By _____
A. D. Mayfield
Sanitary Engineer

VWW:ccl